B.Sc. GEOGRAPHY LAB MANUAL

1st Semester

Prepared By
Pure & Applied Science Dept.
Geography

MIDNAPORE CITY COLLEGE

MIDNAPORE CITY COLLEGE

Department of Pure and Applied Sciences
Laboratory Manual for Bachelor of Science (Honours)
Major in Geography
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Semester - I

PREFACE TO THE FIRST EDITION

This is the first edition of Lab Manual for BSc (Honours) Major in Geography (First Semester). Hope this edition will help you during practical. This edition mainly tried to cover the whole syllabus. Some hard topics are not present here that will be guided by responsive teachers at the time of practical.

ACKNOWLEDGEMENT

We are really thankful to our students, teachers, and non-teaching staffs to make this effort little bit complete. Mainly thanks to Director and Principal Sir to motivate for making this lab manual.

Course Type: Major-1P
Course Code: GEOHMJ101
Geotectonics and Geomorphology (Practical)

Course Objective

1. To understand the geotectonic processes and understand the association between geomorphological landforms, concepts and processes.

2. To critically evaluate and connect information about geomorphic processes.

3. To provide a theoretical and empirical framework for understanding landscape evolution and the characteristics of individual types of geomorphic landscapes by studying different theories.

Course Learning Outcomes

After the completion of course, the students will have ability to:

1. Understand the functioning of Earth systems in real time and analyze how the natural and anthropogenic operating factors affects the development of landforms

2. Distinguish between the mechanisms that control these processes

3. Assess the roles of structure, stage and time in shaping the landforms, interpret geomorphological maps and apply the knowledge in geographical research.

Course contents:

1. Characteristics of Rocks and minerals and their identification:

2. Geological Maps: Understanding topography, structure, relation between topography and structure, geological succession and geological history through construction of geological section on Horizontal, Homoclinal, Folded and faulted Structure.

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1. Characteristics of Rocks and minerals and their identification:

Rocks

Rock is the solid mineral material forming the surface of the earth. A rock is composed of one or more minerals. Petrology is the science of rocks which includes the studying of mineral composition, structure, texture, origin, occurrence, alteration and relationship with other rocks. The age of a rock is determined based on carbon-14 dating.

Classification of Rocks

Based on the origin, rocks are of three types – igneous, sedimentary and metamorphic.

Igneous Rocks

"Ignis" in Latin means 'fire'. Igneous rocks are formed out of magma and lava from the interior of the earth. When magma in its upward movement cools and turns into solid form, it is called igneous rock.

There are two types of igneous rocks – intrusive rocks e.g., granite and extrusive rocks e.g., basalt Deccan Traps.

- Intrusive rocks are formed when magma rises and cools within the crust which gives rise to various forms like batholiths, laccoliths, dyke, etc.
- Extrusive rocks are formed when cooling and solidification takes place on the surface of the earth.

Igneous rocks are also classified based on the texture, size and arrangement of grains or other physical conditions of the materials. If the magma cools slowly at great depths, mineral grains increase in their size. Sudden cooling at the surface results in small and smooth grains.

The igneous rocks are the oldest of all the rocks. Pegmatite, gabbro, granite, basalt, tuff are some of the examples of igneous rocks.

Sedimentary Rocks

Sedimentary rocks are also called detrital rocks. The word 'sedimentary' is derived from the Latin word sedimentum, which means settling. Rocks of the earth's surface undergo denudation and are broken into various fragments. These fragments are transported by different exogenous forces and deposited. These deposits through compaction turn into sedimentary rocks. The process is called lithification. Sedimentary rocks occupy only 5% of the earth. They are layered or stratified of varying thickness.

Sedimentary rocks are of three types depending upon the mode of formation –

- Mechanically formed sedimentary rocks – For example, conglomerate, loess, limestone, sandstone, etc.
- Chemically formed – For example, potash, halite, etc.
- Organically formed – For example, chalk, coal, limestone, geyserites, etc.

Metamorphic Rocks

The word metamorphic means 'change of form'. The metamorphic rocks form under the action of pressure, volume and temperature (PVT change). Metamorphism is a process by which the already consolidated rocks undergo recrystallisation and reorganization of materials within original rocks. The igneous and metamorphic rocks together account for 95% of the earth. The breaking and crushing of the original minerals within rocks without any significant chemical changes is called dynamic metamorphism. When the materials of the rocks alter chemically and recrystallise, the process is known as thermal metamorphism. Thermal metamorphism is of two types – contact metamorphism and regional metamorphism.

- **Contact Metamorphism** – In this case, the rocks come in contact with hot magma and lava as a result of which rock materials recrystallise under high temperatures. Generally, new materials form when lava/magma interacts with the rocks.
- **Regional Metamorphism** – Due to deformation caused by tectonic shearing together with high temperature or pressure or both, rocks undergo recrystallisation which is known as regional metamorphism.

Sometimes rock grains or minerals form layers or lines during the process of metamorphism. Such an arrangement in metamorphic rocks is called foliation or alienation. Sometimes minerals of different nature form alternating arrangements of thin and thick layers which appear in light and dark shades. Such an arrangement in metamorphic rocks is called banding and such rocks are called banded rocks. Slate, diamond, marble, quartzite, schist, gneiss are some examples of metamorphic rocks.

Sl. No.	Name of Rocks	Characteristics	Figure
1	Basalt	• **Composition:** Basalt is primarily composed of dark-colored minerals, including plagioclase feldspar, pyroxene, and sometimes olivine. It contains minimal quartz content. • **Texture:** Basalt typically has a fine-grained to aphanitic (microcrystalline) texture. The crystals are too small to be seen with the naked eye. • **Color:** Basalt is typically dark gray to black, but it can also be brown or green, depending on its mineral composition and weathering. • **Hardness:** Basalt is relatively hard and has a hardness of around 6 on the Mohs scale, making it suitable for various construction applications. • **Density:** Basalt is denser than many other common rocks and has a density of approximately 2.8 to 3.0 g/cm³. • **Porosity:** Basalt is generally low in porosity, which means it is relatively impermeable to water and other fluids.	
2	Granite	• **Composition:** Granite is primarily composed of three essential minerals: quartz, feldspar (orthoclase or plagioclase), and mica (usually biotite or muscovite). It may also contain other minerals like amphibole and pyroxene. • **Texture:** Granite typically has a coarse-grained texture, with visible crystals that are often several millimeters to centimeters in size. • **Color:** Granite comes in a variety of colors, including pink, gray, white, black, and various shades of red, brown, and green. The specific colors depend on the proportions and types of minerals present. • **Hardness:** Granite is a hard rock and ranks about 6-7 on the Mohs scale of mineral hardness, making it resistant to abrasion.	

		• **Density:** Granite is relatively dense, with a density typically ranging from 2.63 to 2.75 g/cm³.	
3	Gabbro	• **Composition:** Gabbro is primarily composed of dark-colored minerals, including plagioclase feldspar and pyroxene. It may also contain small amounts of amphibole, olivine, and other minerals. • **Texture:** Gabbro typically has a coarse-grained to phaneritic texture, meaning the individual mineral grains are large enough to be visible to the naked eye. • **Color:** Gabbro is generally dark green to black in color, although it can vary from light gray to very dark depending on its mineral composition. • **Hardness:** Gabbro is a hard rock with a hardness of about 6-7 on the Mohs scale, making it suitable for construction and road-building materials. • **Density:** Gabbro is relatively dense, with a density ranging from 2.7 to 3.3 g/cm³.	
4	Rhyolite	• **Composition:** Rhyolite is primarily composed of light-colored minerals, particularly quartz, feldspar (orthoclase or plagioclase), and smaller amounts of mica (biotite or muscovite) and amphibole. • **Texture:** Rhyolite typically has a fine-grained to aphanitic (microcrystalline) texture, meaning its mineral grains are too small to be seen with the naked eye. • **Color:** Rhyolite is usually light to pale gray, pink, or buff, although it can range from light gray to pink, white, and even green, depending on mineral composition and weathering. • **Hardness:** Rhyolite is a relatively hard rock with a hardness of around 6-7 on the Mohs scale. • **Density:** Rhyolite has a density ranging from 2.4 to 2.7 g/cm³, which makes it less dense than basalt but still relatively dense for an igneous rock.	

5	Sandstone	• **Composition:** Sandstone is primarily composed of sand-sized mineral, rock, or organic particles that are primarily composed of quartz, feldspar, and lithic fragments. The cement that holds these particles together is often composed of minerals like silica, calcite, or iron oxides. • **Texture:** Sandstone is known for its granular texture, which is the result of the sand-sized particles that make up the rock. It can have a variety of textures, from fine-grained to coarse-grained. • **Color:** The color of sandstone varies widely and can be influenced by the mineral composition. Common colors include shades of red, brown, yellow, white, gray, and even green or blue. • **Hardness:** Sandstone has a variable hardness depending on its cementing material, but it generally ranks around 6-7 on the Mohs scale, making it relatively hard and durable. • **Porosity:** Sandstone can have varying degrees of porosity, which means it can contain open pore spaces between the sand grains. This porosity can make sandstone a good aquifer or reservoir rock.	
6	Limestone	• **Composition:** Limestone is primarily composed of the mineral calcite (CaCO3), which can come from the shells of marine organisms, chemical precipitation, or the alteration of other minerals. Some limestones may also contain dolomite (a mineral composed of calcium and magnesium carbonate). • **Texture:** Limestone can have a range of textures, from fine-grained to coarse-grained. Some limestone varieties are aphanitic (microcrystalline), while others are crystalline. • **Color:** Limestone typically appears in various shades of gray, but it can also be white, tan, yellow, or even black, depending on impurities and mineral content.	

		• **Hardness:** Limestone is a relatively soft rock with a hardness of about 3 on the Mohs scale. • **Density:** Limestone has a density ranging from 2.3 to 2.7 g/cm³. • **Porosity:** Limestone can be highly porous, which means it can contain numerous pore spaces that may store water or act as reservoirs for oil and gas.	
7	Slate	• **Texture:** Slate has a very fine-grained, foliated texture, which means that it is composed of very small mineral grains that are oriented parallel to one another. This texture gives it a distinctive layered appearance. • **Color:** Slate comes in a variety of colors, including shades of gray, green, blue, black, red, and purple, depending on its mineral content and impurities. • **Cleavage:** Slate exhibits excellent cleavage along its foliation planes, allowing it to be easily split into thin, flat sheets. This property makes it suitable for use as roofing and wall cladding material. • **Hardness:** Slate is relatively hard and has a hardness of about 5.5 on the Mohs scale, making it resistant to scratching and abrasion. • **Durability:** Slate is known for its durability and resistance to weathering, which makes it a popular choice for roofing and outdoor applications.	
8	Marble	• **Composition:** Marble is primarily composed of the mineral calcite (CaCO3), which is a crystalline form of calcium carbonate. Marble can also contain impurities and variations in mineral composition, resulting in different colors and patterns. • **Texture:** Marble has a fine to coarse-grained crystalline texture, which gives it a smooth, polished appearance when cut and polished. The crystals are often large enough to be visible to the naked eye. • **Color:** Marble comes in a wide range of colors, including white, gray, black, pink,	

		green, blue, and various shades of brown. The color variations are often due to impurities and mineral content. • **Veining:** Many types of marble exhibit distinctive veining patterns, which are often caused by mineral impurities or structural deformation during the rock's formation. These veins can add to the stone's aesthetic appeal. • **Hardness:** Marble is a relatively soft rock with a hardness of about 3-4 on the Mohs scale. This softness makes it easy to carve and shape. • **Luster:** Marble has a vitreous to pearly luster, which makes it highly reflective and adds to its visual appeal.	

Minerals and Rocks

About 98% of the total crust of the earth is composed of eight elements namely, oxygen, sodium, calcium, iron, magnesium, silicon, aluminium and potassium, and the rest is constituted by titanium, hydrogen, phosphorus, manganese, carbon, sulfur, nickel and other elements. These elements combine with other elements to form substances called minerals.

Definition of a mineral – A mineral is defined as a naturally occurring organic and inorganic substance, having an orderly arrangement of atoms and a definite composition and physical properties.

The elements found in the lithosphere combine in different ways to form minerals of various types. About 2000 minerals have been found in the earth’s crust, but most of the commonly occurring ones are related to six major mineral groups that are called major rock-forming minerals.

The hot magma in the interior of the earth is the main source of all minerals. The magma cools and crystals of minerals get formed. A systemic series of minerals are formed in sequence to solidify so as to form rocks.

Physical Characteristics of Minerals

- **External crystal form** – External shape of a mineral is determined by its internal arrangement of molecules. It can be cubic, tetrahedral, tabular, hexagonal, etc.
- **Cleavage** – The property of breaking along specific planes is called cleavage. Crystals have one plane along which the bonding between the atoms is weaker than along other planes.

- **Fracture** – When the internal molecular arrangement is so complex that there are no planes of molecules, the crystal will break in an irregular manner.
- **Lustre** – Lustre describes the shining quality of an object. Each mineral has a distinctive lustre like metallic, glossy, silky, etc.
- **Colour** – The colour of a mineral depends on its molecular structure. Some minerals show specific colours like malachite (green), azurite (blue), chalcopyrite (golden yellow), etc. Some minerals due to the presence of different impurities show different colours, such as quartz – it can be red, white, green, etc.
- **Streak** – It is the colour of the ground powder of any mineral. It may be of the same colour as the mineral or different. For example, Malachite is green and gives a green streak, Fluorite is purple or green but gives a white streak, chromite and magnetite are almost black and can be distinguished by their streaks – brown for chromite and black for magnetite.
- **Specific gravity** – It is the ratio between the weight of a given mineral and the weight of an equal amount of water. Since it is a ratio, it has no units. For instance, the specific gravity of quartz is 2.65.
- **Hardness** – The hardness of a mineral is measured by its ability to resist scratching. In order to have a standard method of expressing the hardness of minerals, a standard scale called the Mohs scale is commonly adopted.
- **In the sequence of increasing hardness from 1 – 10, the following minerals are used as the standard of comparison** – talc, gypsum, calcite, fluorite, apatite, feldspar, quartz, topaz, corundum and diamond. Compared to this, a fingernail is 2.5 and glass or knife blade is 5.5.
- **Structure** – It refers to the particular arrangement of the individual crystals.
- **Transparency** – Transparent, when the light rays pass through so that the objects can be seen. Translucent, when light rays pass through but get diffused and the objects cannot be seen. Opaque, when the light will not pass through.

Classification of Minerals

Broadly, minerals can be classified into metallic and non-metallic minerals.

Metallic Minerals

These minerals are composed of metals and can be divided into three subtypes –

- Precious metals – Platinum, gold, silver, etc.
- Ferrous metals – Iron mixed with other metals.
- Non-ferrous metals – Metals other than iron like copper, aluminium, lead, zinc, tin, etc.

Metallic minerals are generally obtained from igneous rocks, and are malleable and ductile.

Non-Metallic Minerals

These minerals are composed of non-metals like sulphur, silicon, phosphorus. For example, cement is a mixture of non-metallic minerals. Non-metallic minerals are generally obtained from sedimentary rocks, lacking malleability and ductility.

Sl. No.	Name of Minerals	Characteristics	Figure
1	Feldspar	• Color: Variable, but often pink, white, or gray. • Hardness: 6-6.5 on the Mohs scale. • Luster: Vitreous (glassy). • Cleavage: Perfect cleavage in two directions at nearly right angles. • Crystal System: Triclinic, monoclinic, or orthorhombic, depending on the specific type. • Common Uses: Used in ceramics and as a source of aluminum.	
2	Quartz	• Color: Variable, often clear or white, but can be colored. • Hardness: 7 on the Mohs scale (very hard). • Luster: Glassy. • Cleavage: Typically lacks cleavage. • Crystal System: Hexagonal. • Transparency: Transparent to translucent. • Common Uses: Used in jewelry, glassmaking, and as an abrasive in industrial applications.	
3	Pyroxene	• Pyroxene forms 10% of the earth's crust and is usually found in meteorites. • Pyroxene minerals are minor to secondary additives of a few rocks which are used as beaten stone and measurement stone • It is usually found in green or black colour. • A few pyroxene minerals are used as gem materials.	

4	Amphibole	• Amphibole forms 7% of the earth's crust and is generally green or black in colour. • Aluminium, magnesium calcium, silicon and iron are significant elements of it. • It is mainly used in asbestos industries. • Hornblende is another form of amphibole.	
5	Mica	• Color: Commonly black, brown, or silver. • Hardness: 2.5-3 on the Mohs scale (very soft). • Luster: Pearly or vitreous. • Cleavage: Perfect basal cleavage, resulting in thin, flexible sheets. • Crystal System: Monoclinic. • Common Uses: Used in electrical insulators, as a lubricant, and in cosmetics.	
6	Olivine	• Olivine consists of magnesium, iron and silica. • It is a greenish crystal, often found in basaltic rocks. • Other minerals such as chlorite, calcite, magnetite, haematite, bauxite, and barite are present in small amounts in the rocks in addition to these primary minerals. • Olivine is used commonly in jewellery.	
7	Calcite	• Color: Usually colorless or white, but can be various colors. • Hardness: 3 on the Mohs scale (relatively soft). • Luster: Vitreous to pearly.	

		• Cleavage: Perfect rhombohedral cleavage. • Crystal System: Hexagonal. • Transparency: Transparent to translucent. • Common Uses: Used in construction, as a filler in products like paint and plastics, and as a source of calcium in the manufacture of cement.	
8	Hematite	• Color: Silver-gray to black. • Hardness: 5.5-6.5 on the Mohs scale. • Luster: Metallic. • Cleavage: None. • Crystal System: Hexagonal. • Common Uses: Used as an ore of iron, in jewelry, and as a pigment in paints.	
9	Pyrite (Fool's Gold)	○ • Color: Shiny metallic appearance, often brassy yellow. • Hardness: 6-6.5 on the Mohs scale. • Luster: Metallic. • Cleavage: None. • Crystal System: Isometric (cubic). • Common Uses: Often mistaken for gold, used in jewelry and as a source of sulfur.	

2. Geological Maps: Understanding topography, structure, relation between topography and structure, geological succession and geological history through construction of geological section on Horizontal, Homoclinal, Folded and faulted Structure.

What are geological structures?

If the Earth's crust were completely uniform and homogeneous (the same everywhere), we would have great difficulty figuring out anything about its history. Fortunately, the Earth's crust contains structures of many kinds. Structures are variations in the properties of the Earth's crust. Those variations may be:

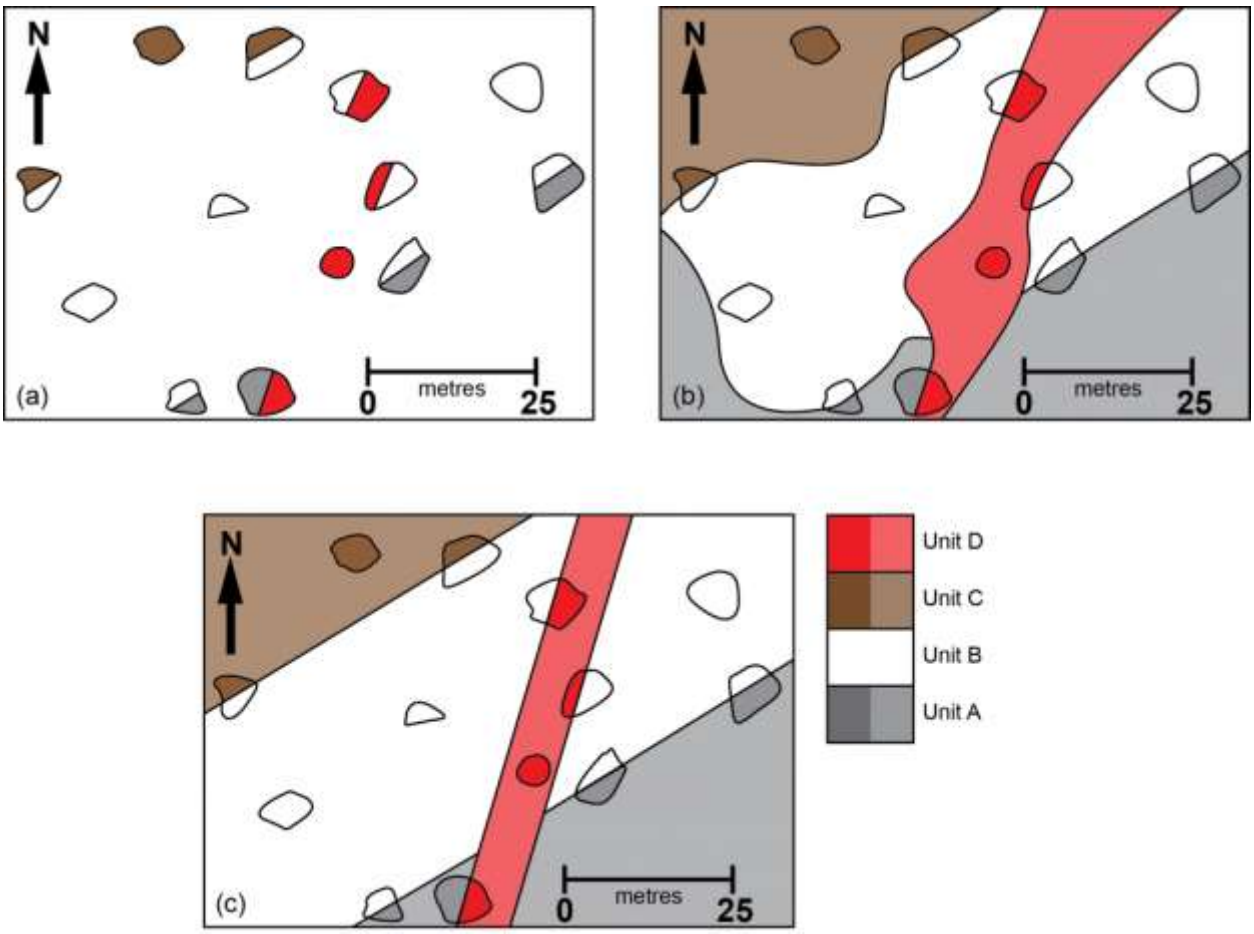
- Spatial variations: the rocks of the Earth's crust vary from place to place, either on the surface or below; or
- Directional variations: rocks look different when viewed from different directions.

For example, where one type of rock contacts another, there is a geological boundary, a type of structure. Geological boundaries include:

- faults
- bedding planes
- the edges of igneous intrusions (intrusive contacts)
- ancient erosion surfaces (unconformities)

Geological map

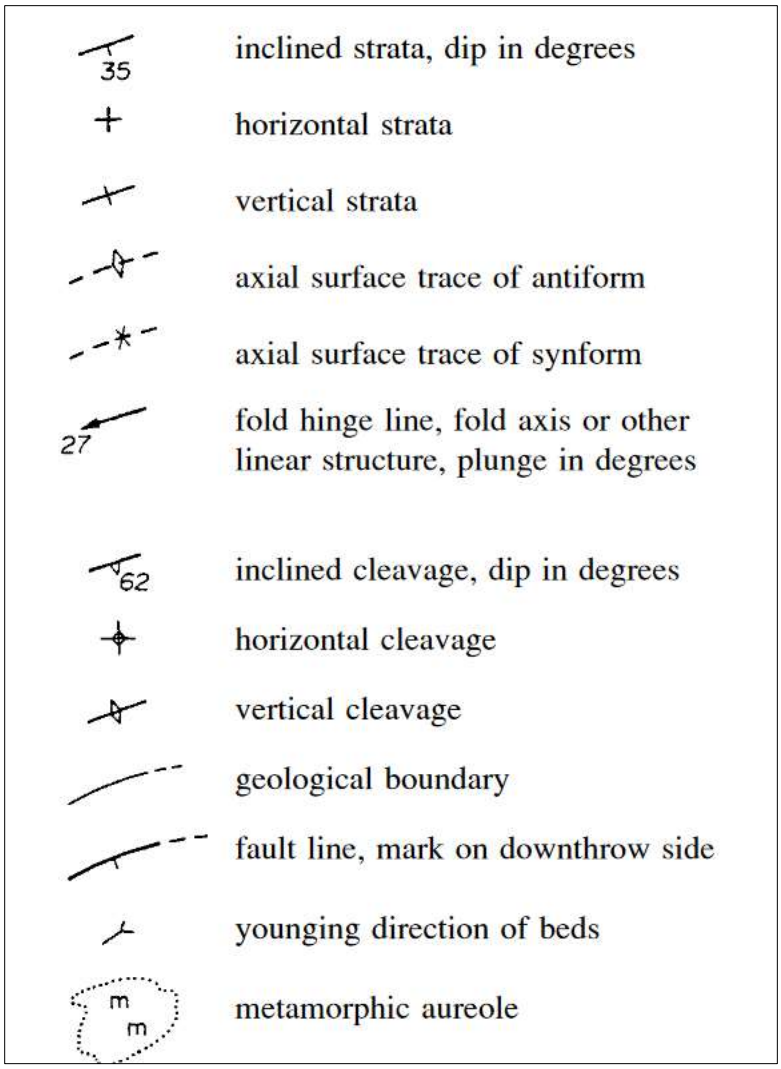
A geological map depicts the presence and distribution of different types of bedrock in a specific area. Typically, it combines a topographic map that represents the terrain's shape with shading or color-coding to indicate the locations of various rock units at or near the Earth's surface.



(a) An outcrop map with (b) an unlikely interpretation and (c) a more likely interpretation, producing a reasonable geological map.

Use of geological map

A geological map serves various purposes. Its primary function is to indicate the composition of near-surface bedrock, which is highly valuable for civil engineers providing guidance on projects like road excavation and bridge placement. Geographers studying land use and mineral companies also rely on these maps for their work. However, experienced geologists can extract even deeper insights from such maps. To a trained eye, the features depicted on a geological map offer crucial information about the geological history of the area. Moreover, the bands of color on the map represent the surface expression of rock layers extending into the Earth's crust at various angles. The intricate patterns on the map, akin to the grain of a polished wooden table, provide revealing insights into the subterranean structure. Interpreting these features effectively necessitates a solid understanding of common geological structures such as faults and folds.



Geological Map Symbols

Orientation of Structures

Linear and planar features in geology

Almost all work on geologic structures is concerned in one way or another with lines and planes.

The following are examples of linear features that one might observe in rocks, together with some kinematic deductions from them:

glacial striae (which reveal the direction of ice movement);

the fabric or lineation produced by alignment of amphiboles seen in metamorphic rocks (which reveal the direction of stretching acquired during deformation);

and the alignment of elongate clasts or fossil shells in sedimentary rocks (which reveals current direction).

Examples of planar features include:

- tabular igneous intrusive bodies such as dykes and sills;
- bedding planes in sedimentary rocks;
- the fabric or foliation produced by alignment of sheet silicate minerals such as mica in metamorphic rocks, which reveals the direction of flattening during deformation;
- joints and faults produced by the failure of rocks in response to stress (and which therefore reveal the orientation of stress at some time in the past).

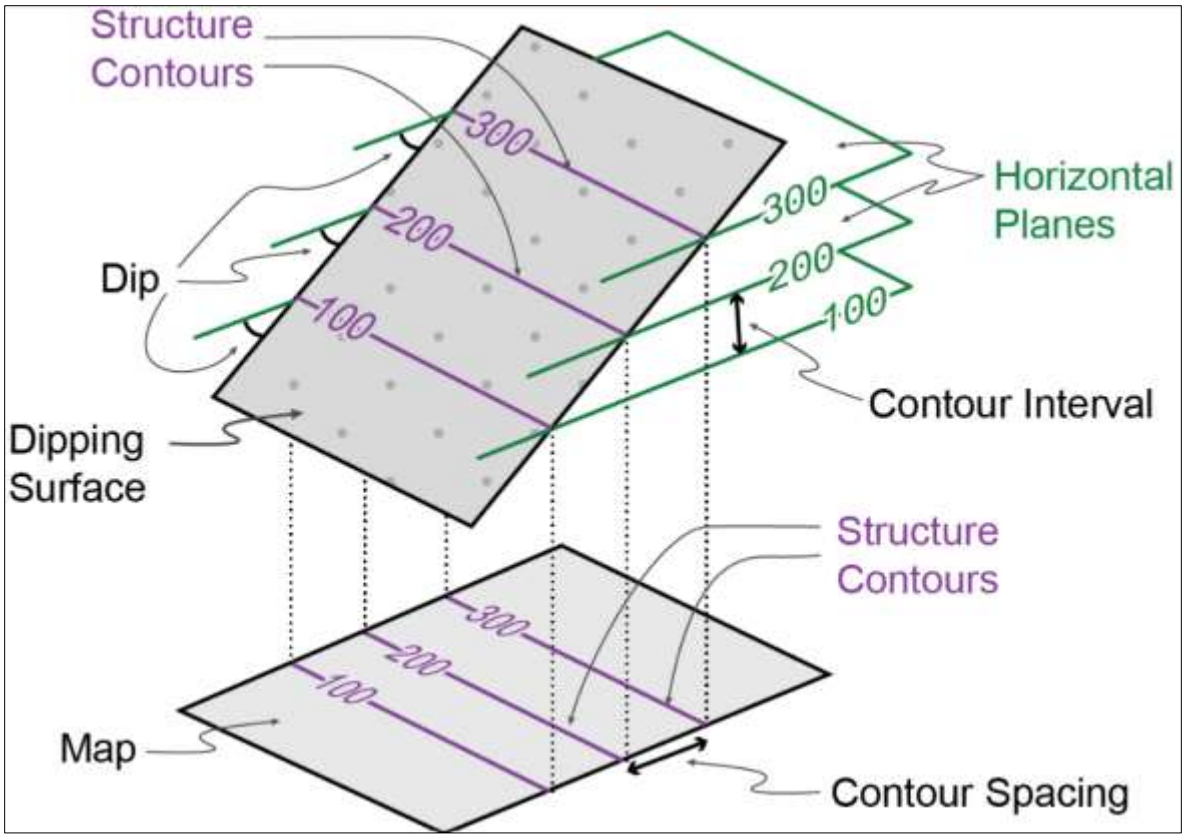
Strike, dip, and contours

Because structure contours are by definition lines of constant elevation, they are parallel to the strike of the geologic surface. They are sometimes called strike lines. So, given a pattern of structure contours it's possible to determine the strike of the surface at any point.

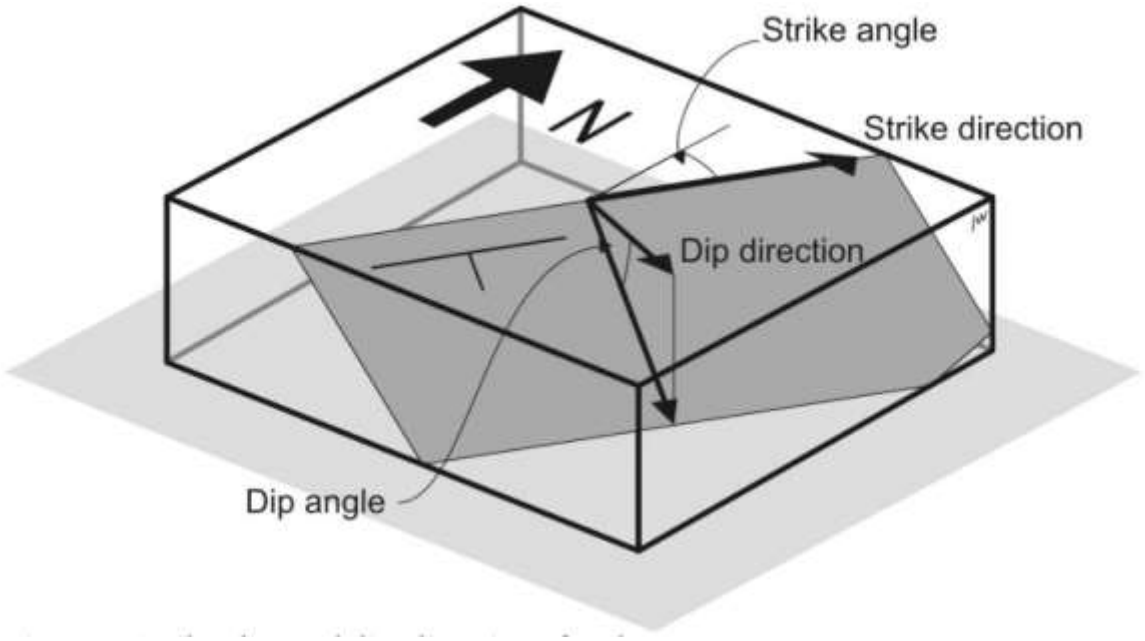
The dip of the surface controls how far apart the contours are. Where a surface dips steeply, the contours are close together; where the surface is near-horizontal the contours are far apart. The horizontal spacing of contours, recorded on the map is called the contour spacing. There is a simple relationship between the dip δ of a surface and the spacing of its contours.

$$\tan(\delta) = \text{contour interval} / \text{contour spacing}$$

If a surface is planar (i.e., the strike and dip are constant) then the contours will be parallel, equally spaced, straight lines. Thus, you can readily determine the orientation of a surface from the azimuth and spacing of its structure contours.

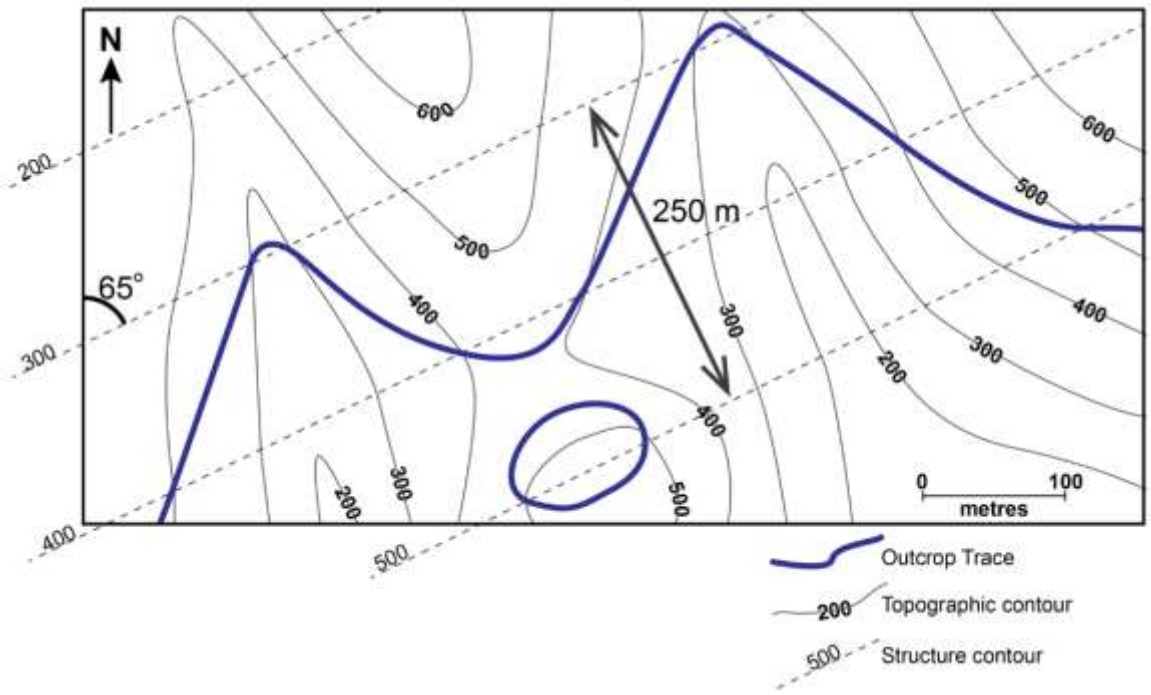


Relationship between dip and contour spacing.



Strike, dip, and dip-direction of a plane.

Contours and outcrop traces



Structure contour construction on the map in Fig. 9. The strike and dip of the surface can be determined from the contour orientation and spacing. In this case, the structure contours are oriented 65° from north, but the numbers on the contours tell us that the surface gets lower towards the NW, so the RHR strike is: 65° + 180° = 245°. The structure contours are 125 m apart and the contour interval is 100 m. Dip = arctan(100/125) = 39°. Therefore, the RHR orientation of the surface is: 245/39 NW

Materials for drawing of geological cross-section:

- Basic Methods of Structural Geology by Marshak & Mitra
- several sheets of 8½″ × 11″ plain, white paper
- protractor
- ruler
- pencil
- eraser
- coloured pencils
- tape
- calculator

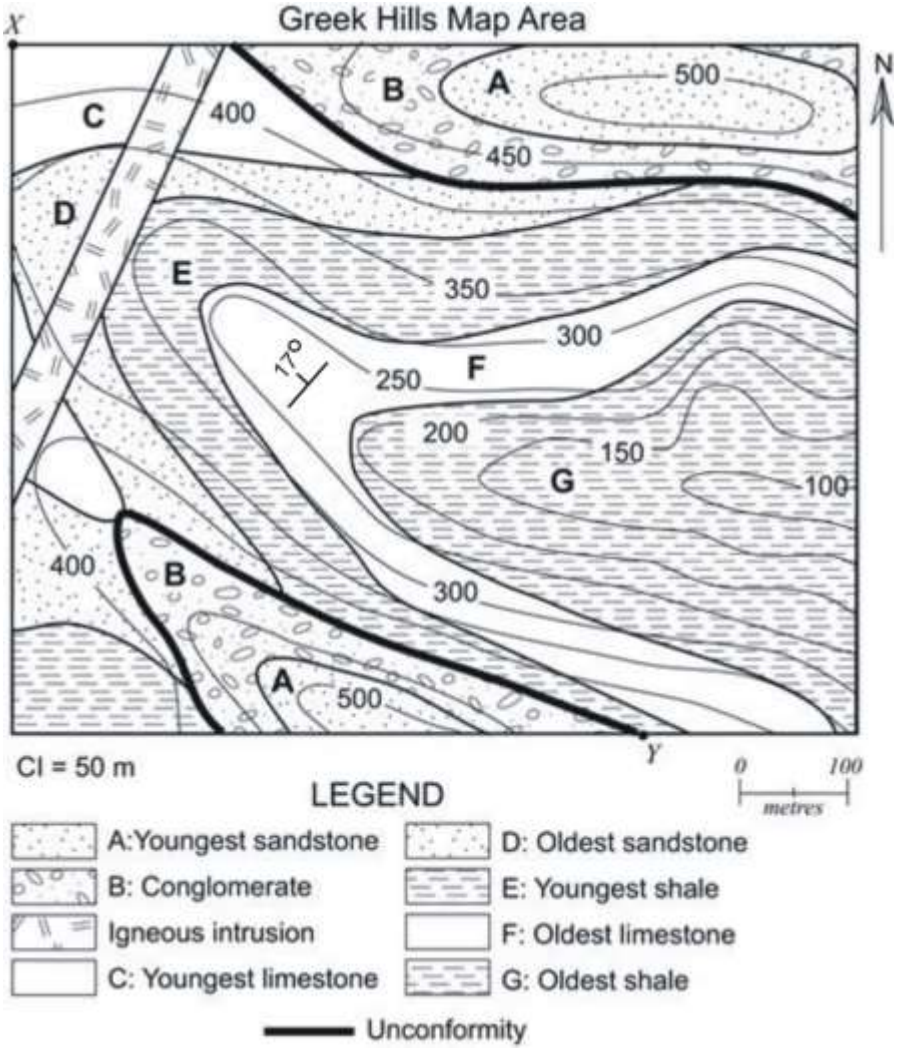
Steps for drawing of geological cross-section:

Drawing a geological cross-section is an important task in geology for representing the subsurface structure of an area. The process involves several steps to accurately depict the geological features

and rock layers beneath the Earth's surface. Here are the steps for drawing a geological cross-section:

1. Selection of a Section Line:

Choose the location and orientation of the cross-section line. This line should intersect the geological features of interest and provide a clear representation of the subsurface geology.



Geologic map

2. Identification of Structure and Series of the Map:

Determine the geological formations and rock units that the cross-section will traverse. It's essential to identify the different series or strata in the area and their boundaries.

3. Drawing of Strike Line:

Draw the strike line on the cross-section to represent the orientation of rock layers. The strike line is perpendicular to the bedding planes.

4. Observation of Dip, Dip Direction, and Thickness of the Beds:

Observe and record the dip (inclination) of each geological bed, the dip direction (the direction the bed is inclined), and the thickness of each bed along the section line. This data is crucial for accurate representation.

5. Rough Sketches & Estimation for Drawing of Cross Section:

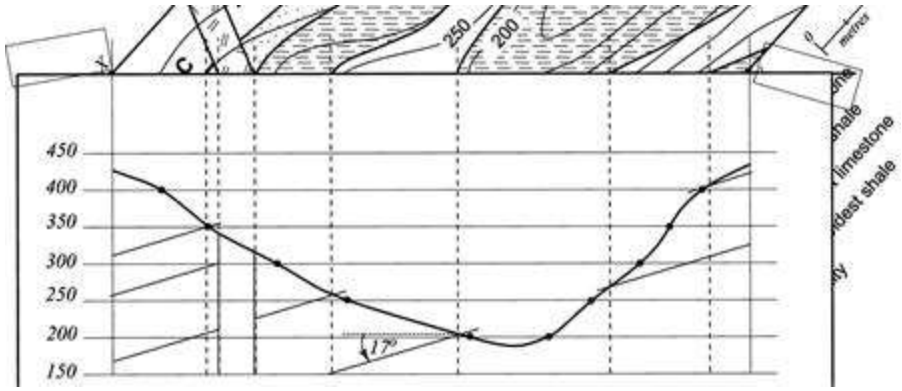
Create rough sketches or drafts to visualize the cross-section. Estimate the relative positions of beds and structures based on the observed data.

6. Making of the Paper Strip:

Prepare a long strip of paper or drawing surface, which will serve as the canvas for the cross-section. The dimensions of the strip should correspond to the scale of the cross-section.

7. Drawing of Cross Section:

Start drawing the cross-section on the paper strip using the rough sketches and observed data as a guide. Pay close attention to the dip, dip direction, and thickness of each bed. Use appropriate symbols and notations to represent geological features accurately.



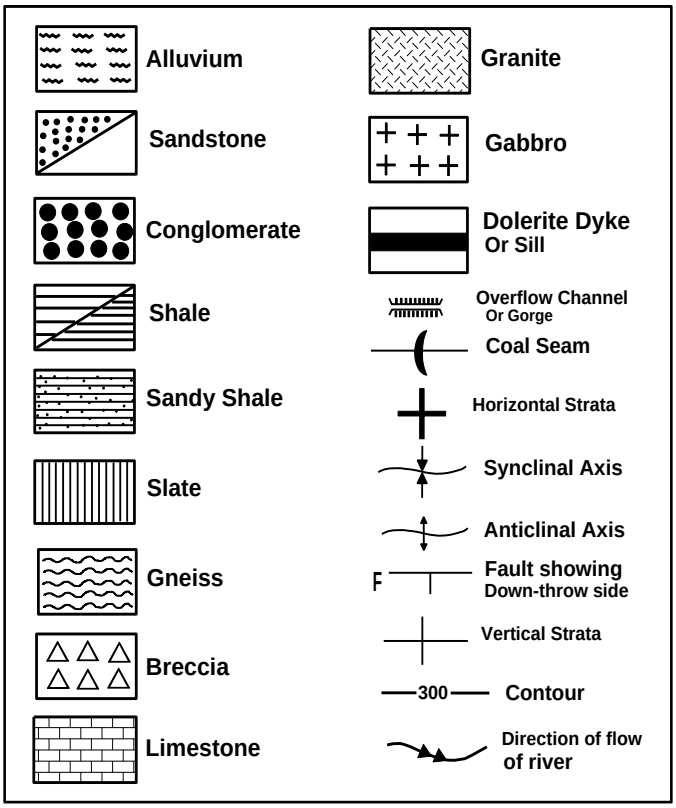
Drawing a geological cross-section

8. Relief Profile Drawing:

Depict the topography or relief profile on the cross-section to show how the land surface interacts with the underlying geological formations.

9. Beds and Unconformity Drawing:

Carefully draw each geological bed, and if there are unconformities (discontinuities in the rock record), represent them with appropriate symbols or lines.



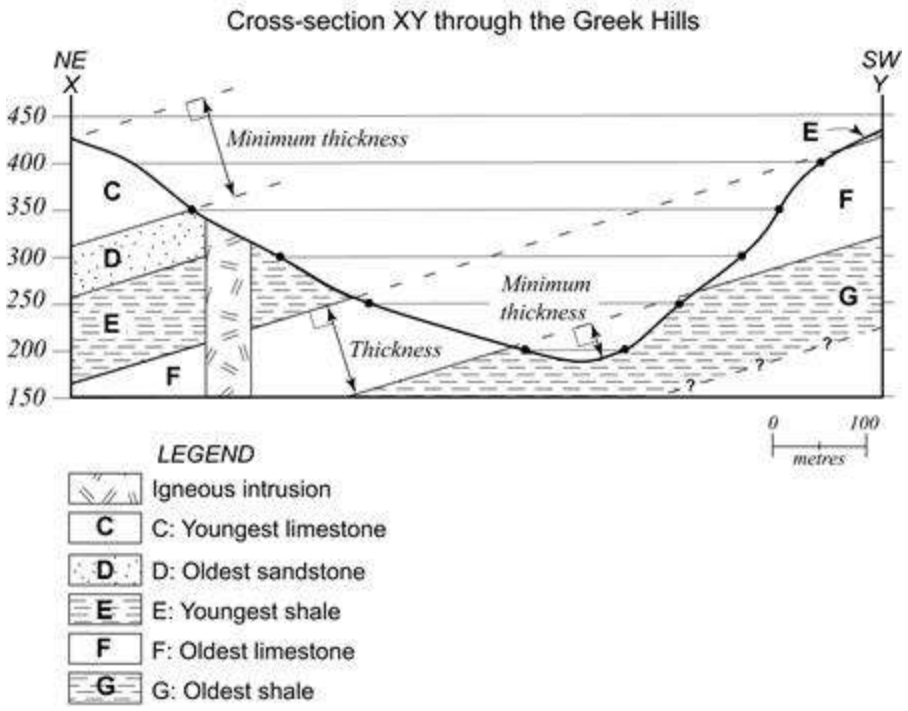
Conventional signs and symbols used in geological map interpretation

10. The Sequence of Beds and Annotation:

Sequence the beds from top to bottom, indicating their relative positions. Add annotations and labels to provide information about each geological unit.

11. Succession of Beds Heading & Caging:

Include a heading that provides information about the location, scale, and orientation of the cross-section. Also, consider adding a key or legend for symbols and annotations.



Completed geological cross-section

12. Scale of Drawing:

Clearly indicate the scale of the cross-section to ensure accurate interpretation of distances and dimensions.

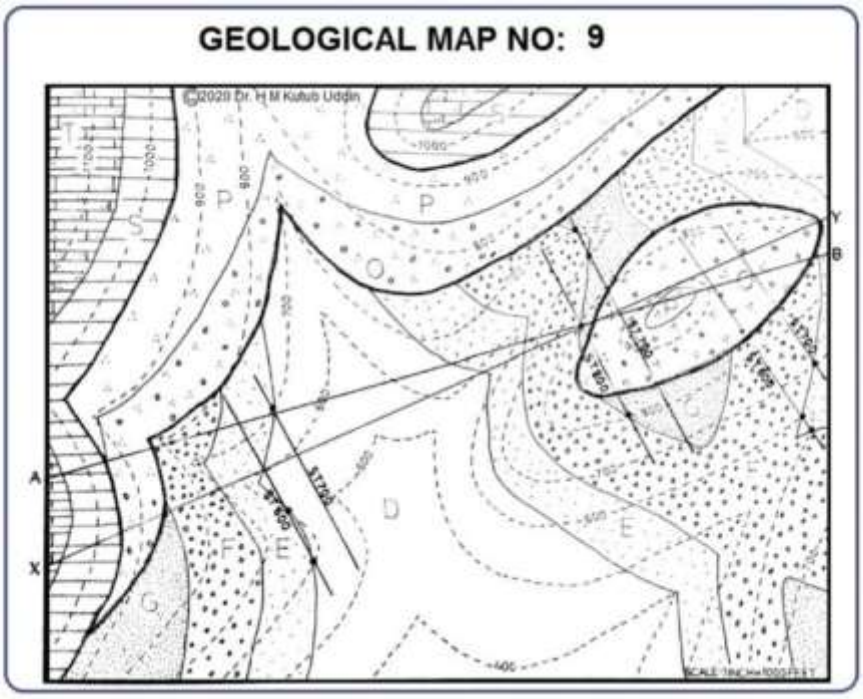
13. Final Check and Review:

Before finalizing the cross-section, double-check the accuracy of your representation against your field observations and geological knowledge.

Drawing a geological cross-section is a meticulous process that requires attention to detail and a solid understanding of geological principles. The final cross-section should accurately convey the subsurface geology of the area and provide valuable insights for geological analysis and interpretation.

Interpretation of Geological Map

In the topic drawing of cross-section and interpretation of geological maps we will now proceed for interpretation of the map. The interpretation of the geological map is the outcome of its different attributes in detail. It is the final part of a geological map understanding. After drawing of cross-section, we generally proceed for interpretation of the geological map. A sample format of geological map interpretation for map number 9, we can discuss in the following subheadings.



1. Introduction:

- Map No: 9
- The scale of the map: 1inch to 1000ft.
- Area of the map: 8inch x 10 inches =80 sq. inch in the map is equivalent of 0.0199 sq miles in the ground.
- Maximum & minimum altitude of the map: 1100ft in western part & 400ft in the southern part.
- Cross-section line and its length and direction: AB. A is in the western end and B is in the eastern end. The length of AB is 10.5 inch which is about 0.166 miles in the ground.
- The number of series of the given map: It is a triple series map with two distinct unconformities.

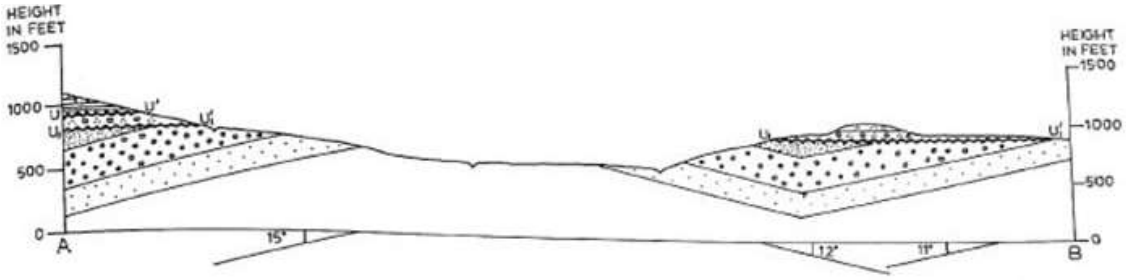
2. Topography:

The geological map covers a portion of a dissected plateau or highland region. The highest point in the entire area reaches an elevation of 1100 feet in the western section. Notably, a nearly semicircular, flat-topped region in the northern part is the next highest, enclosed by the 1000-foot contour line. Conversely, the lowest altitude within the region is found in the southernmost area, where the 400-foot contour line passes. Consequently, there is a remarkable relative relief of 700 feet within the region.

This region is crisscrossed by five river valleys. The primary river flows from the north-northeast to the south, cutting through the upper series rock beds in the northern part and traversing both

upper and lower series rock beds as it flows from the middle to the southern part. In the eastern region, two nearly parallel tributaries join the left bank of the main river. Notably, in the northeastern part of the map, there is a likelihood of river capture, where two rivers flowing in opposite directions are rapidly approaching each other due to headwater erosion.

From the western region, additional tributaries contribute to the main river on its right bank. In the middle to the southern portion of the region, the lower series rock beds are exposed due to the erosive action of the descending river. The interplay between the topography and the river systems has played a pivotal role in shaping the region's geological and geomorphological characteristics.



Scale: 1 inch to 1000 feet.

3. Succession of rock beds:

A detailed examination of the succession of eight rock beds and three series in the following table is essential for a comprehensive understanding of the geological map. This in-depth analysis will greatly aid in interpreting the map accurately.

SUCCESSION OF BEDS (Map No: 9)

GEOLOGICAL SERIES	BEDS	SYMBOL	THICKNESS (FEET) TRUE	THICKNESS (FEET) VERTICAL	AMOUNT OF DIP TRUE	AMOUNT OF DIP APPARENT	TRUE DIP DIRECTION	REMARK
UPPER SERIES	T			100'	—	—	—	HORIZONTAL STRUCTURE
	S		100'	100'				
LINE OF UNCONFORMITY								
MIDDLE SERIES	P			50'	6°0'32"	1°54'22"	N 36°W	UNICLINAL STRUCTURE
	O		100'	100'				
LINE OF UNCONFORMITY								
LOWER SERIES	G			300'	RL: 11°46'5"	RL: 11°30'4"	RL – S 58°W	FOLDED STRUCTURE
	F		300'	310'	ML: 12°5'43"	ML: 12°15'53"	ML – N 60°E	
	E		200'	210'	LL: 14°44'36"	LL: 14°22'53"	L.L – S 62°W	
	D			700'				

4. Geological Structure:

The geological map illustrates three distinct series of rock beds. The upper series, characterized by a horizontal structure, encompasses rock beds 'S' and 'T,' both measuring 100 feet in thickness. Although the map doesn't allow for the direct measurement of their thickness, the cross-section

provides this crucial detail. The middle series, displaying a Uniclinal structure, is composed of two rock beds, 'O' and 'P.' 'O' is 100 feet thick, while 'P' is challenging to measure accurately due to the absence of its upper bedding plane. Along section line AB, there is an apparent dip of approximately 2 degrees in the middle series. The lower series exhibits a folded structure, featuring a prominent anticline in the central region and a syncline on the eastern side. Consequently, the region is characterized by three folded limbs, each with varying dip angles and directions. This lower series includes rock beds 'D,' 'E,' 'F,' and 'G.' 'D' represents the oldest lower bed, and 'G' is the top bed in this series. The thicknesses of 'E' and 'F' are 200 feet and 300 feet, respectively. However, the thicknesses of 'D' and 'G' remain indeterminable due to the absence of lower and upper bedding planes for these particular beds. The geological composition and structure of these rock beds play a significant role in shaping the region's topography and geological history. The data provided is instrumental in understanding the stratigraphy and geological evolution of the area.

5. The relation between Structure and topography:

The given geological map and the region's topography exhibit a close and intricate relationship. Notably, five major valleys in the mapped area reveal both positive and negative correlations between the geological structure and the landform features. In the central part of the region, the relatively lower elevation is a consequence of substantial erosion, establishing a positive relationship between structure and topography. Conversely, in the northeastern and southwestern regions, the lower degree of erosion leads to a negative correlation between structure and topography. On both sides of the region, a notable geological feature emerges: a steep escarpment and cap rock, formed as a result of the horizontal structure of the 'P' bed.

The central part of the region is distinguished by a prominent folded anticline structure in the lower series of rock beds. This geological configuration, in conjunction with the gradual valley deepening and valley-widening processes, gives rise to a wide and steep valley, referred to as an Anticlinal valley. It is in this region that the oldest rock bed, 'D,' is exposed. In the northwestern part of the region, the folded lower series rock beds create a syncline, upon which the cap rock 'O' of the middle series is perched. This geological arrangement results in a topographic feature known as a synclinal ridge.

In comparison to these two distinct parts, the region provides an excellent illustration of a phenomenon called the inversion of relief. It encompasses a dissected highland landscape characterized by various landforms, including Questa, Escarpment, Mesa, and Butte topographic expressions. The interplay between geological structure and topography within this region yields a complex and captivating terrain, reflecting the dynamic forces that have shaped it over geological time.

6. Geological History:

In the distant geological past, this region was submerged beneath the sea, and during that time, rock beds D, E, F, and G were gradually deposited, maintaining a horizontal orientation. Subsequently, tectonic forces led to the uplift of the region, causing the once-horizontal rock beds to fold. After a significant duration, the area experienced another period of submersion, resulting in the formation of the middle series rock beds 'O' and 'P,' which were initially deposited horizontally. However, during the subsequent uplift of the region, 'O' and 'P' rock beds underwent a slight eastward tilt, disrupting their previous horizontal configuration. This region was once again exposed to the elements and, over an extended period, was subjected to the forces of erosion and sediment deposition. The current landscape reflects the profound impact of prolonged fluvial erosion. This sequence of events has shaped the geological history of the area, leaving behind a distinct geological record that is crucial for understanding the region's past and its ongoing evolution.

Suggested Readings:

1. Anderson, R.S. and Anderson, S.P. 2010. Geomorphology, the Mechanics and Chemistry of Lanscape, Camdridge: Cambridge University Press.

2. Bloom A. L., 2001: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, Third edition, New Delhi.

3. Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.

4. Chorley, R., Schumm, S. and Sugden, D.E. 1994. Geomorphology, Methuen, London: 605p.

5. Chorley, R.J. and Kennedy, B.A. (1971) Physical Geography: a System Approach. London: Prentice Hall.

6. Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company

7. Goudie, A. (Ed) (1990): Geomorphological Techniques, 2nd edition, Allen Unwin Crows Nest.

8. Kale V. S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.

9. Keary, P. and Vine, M. 1997. Global Tectonics, 2nd edition, Blackwell Scientific Publications, Oxford: 302p.

10. Knighton, D.1998: Fluvial Forms and Processes: A New Perspective, Arnold, London: 385p.

11. Leopold, L.B., Wolman, M.G. and Miller, J.P. 1964. Fluvial Processes in Geomorphology, Sanfransisco: W.H. Freeman & Co.

12. Maiti, R. K. 2016. Modern Approaches to Fluvial Geomorphology. New Delhi: Primus.

13. Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP

14. Skinner, Brian J. and Stephen C. Porter (2000), The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons

15. Thornbury W. D., 1969: Principles of Geomorphology, Wiley.

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Course Type: SEC-1P
Course Code: GEOSEC01
Computer Basics and Applications (Practical)

Course Objective

This course is designed to get a preliminary idea of computer and its applications. Those who didn't learn computer in 10+2 level, this course is a stepping stone for them to venture first time into computer-based applications. The objectives of the course are -

- ● *To get an overview of the computer system and its applications.*
- ● *To get an exposer to the computer-based applications.*

Course Learning Outcomes

Upon completion of this course, students will be able to -

- ● *Get a working knowledge of computer hardware and software.*
- ● *Get an idea of managing folders and files.*
- ● *Run an application, preferably, MS Word, MS Excel, MS PowerPoint.*

Course contents:

1. Knowing computer: what is computer, basic application of computer, computer memory, concepts of hardware and software; operating system; running an application, viewing of file, folders and directories, creating and renaming of files and folders.

2. Understanding word processing.

3. Using spreadsheet: basics of spreadsheet; manipulation of cells; formulas and functions; editing of spreadsheet, printing of spreadsheet.

4. Concept of internet; application of internet; World Wide Web; email.

5. Making a small presentation: MS PowerPoint

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1. Knowing computer: what is computer, basic application of computer, computer memory, concepts of hardware and software; operating system; running an application, viewing of file, folders and directories, creating and renaming of files and folders.

What is computer?

A computer is an electronic device that processes data and performs various tasks based on instructions provided to it. Computers are incredibly versatile and can handle a wide range of tasks, from basic calculations to complex simulations. They are a fundamental part of modern life and come in various forms, including personal computers, laptops, smartphones, tablets, and servers.

Fig: Computer (Desktop)

Components of computers

1. **Hardware:** This includes physical components such as the central processing unit (CPU), memory (RAM), storage devices (hard drives or solid-state drives), input/output devices (keyboard, mouse, display, etc.), and the motherboard that connects everything together.

2. **Software:** These are the programs and instructions that tell the computer what to do. Software can be categorized into two main types: system software (like the operating system) and application software (like word processors, web browsers, and games).

3. **Operating System (OS):** The operating system is the core software that manages the computer's hardware and provides a user interface for interacting with the computer. Common operating systems include Windows, macOS, and various flavors of Linux.

4. **Input and Output:** Computers accept input from users and other devices, process it, and produce output. Input can be provided through keyboards, mice, touchscreens, and other input devices, while output is typically displayed on screens or output to printers or other external devices.

5. **Data Processing:** Computers process data using a combination of arithmetic and logical operations. They can perform calculations, manipulate data, and execute complex algorithms.

6. **Storage:** Computers use storage devices (like hard drives or SSDs) to store data and programs. This data can be persistent (stored even when the computer is turned off) or temporary (like data in RAM).

7. **Networking:** Computers can connect to networks, including the internet, to communicate with other computers and access remote resources.

8. **Programming:** Computers can be programmed to perform specific tasks. Programming involves writing code in languages that the computer can understand. Popular programming languages include Python, Java, C++, and many others.

9. **User Interface:** Computers have graphical user interfaces (GUIs) that make them accessible to users. This includes icons, windows, menus, and other elements that allow users to interact with the computer.

10. **Security:** Computer security is essential to protect against threats like viruses, malware, and unauthorized access. This involves using firewalls, antivirus software, and strong passwords.

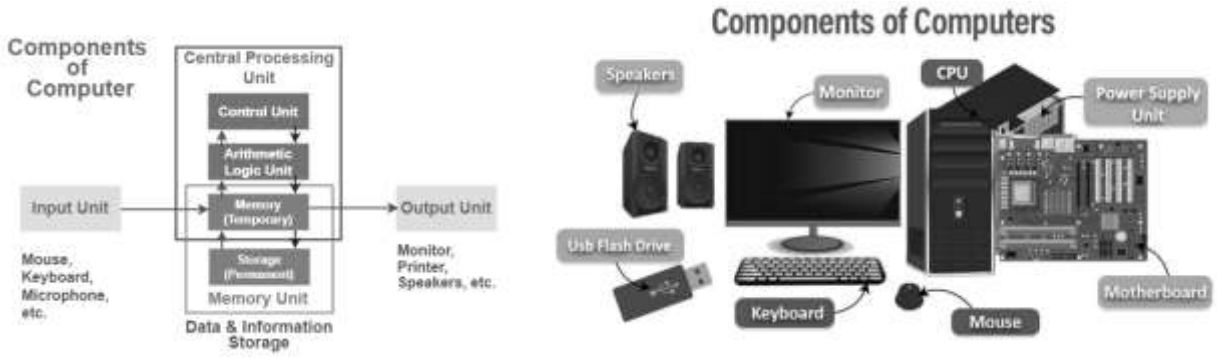


Fig: Components of computer

Basic application of computer

Computers are used in a wide range of applications in various fields due to their versatility and processing power. Here are some basic applications of computers:

1. **Word Processing:** Computers are commonly used for word processing tasks, such as creating, editing, and formatting documents. Popular word processing software includes Microsoft Word and Google Docs.

2. **Internet Browsing:** Web browsers like Google Chrome, Mozilla Firefox, and Microsoft Edge allow users to access information on the internet, search for content, and interact with websites.

3. **Email:** Computers are used for sending, receiving, and managing emails through email clients like Microsoft Outlook, Gmail, and Apple Mail.

4. **Spreadsheets:** Spreadsheets are used for organizing, analyzing, and calculating data. Microsoft Excel and Google Sheets are common spreadsheet applications.

5. **Presentations:** Software like Microsoft PowerPoint and Google Slides enables users to create and deliver presentations with text, images, and multimedia elements.

6. **Graphic Design:** Computers are essential for graphic design tasks using software like Adobe Photoshop and Adobe Illustrator.

7. **Programming:** Computers are used by software developers and programmers to write, test, and debug code in various programming languages.
8. **Gaming:** Video game development and playing games are popular computer applications. High-performance computers and gaming consoles are used for gaming.
9. **Digital Art and Animation:** Computers are used in digital art creation, animation, and 3D modeling, with software like Adobe Animate and Autodesk Maya.
10. **Video Editing:** Video editing software, such as Adobe Premiere Pro and Final Cut Pro, is used for editing and producing videos.
11. **Music Production:** Computers are used for recording, editing, and producing music using digital audio workstations (DAWs) like Pro Tools, Ableton Live, and Logic Pro.
12. **Data Analysis:** Computers are crucial in data analysis, using tools like Microsoft Excel, Python, R, and specialized data analysis software for tasks like statistics and data visualization.
13. **Database Management:** Databases are used for storing and managing large volumes of structured data. Software like Microsoft Access, MySQL, and Oracle are used for database management.

14. **Simulation and Modeling:** Computers are used for scientific simulations, engineering models, and simulations in fields like physics, chemistry, and economics.
15. **Educational Tools:** Computers are used in educational settings for online learning, interactive educational software, and research.
16. **Business Applications:** Businesses use computers for tasks like accounting, inventory management, customer relationship management (CRM), and enterprise resource planning (ERP).
17. **Telecommunications:** Computers are used for communication through email, video conferencing, and voice over IP (VoIP) services.
18. **Healthcare:** Computers are used for electronic health records (EHR), medical imaging, and data analysis in healthcare settings.

Fig: Application of computer

19. **Astronomy and Space Exploration:** Computers are used in the analysis of astronomical data, space mission planning, and control of space probes.
20. **Home Automation:** Computers are used in smart homes to control and automate various household tasks, such as lighting, heating, and security systems.

Computer memory

Computer memory, often simply referred to as memory, is an essential component of computers and other electronic devices. It's used to store and retrieve data and instructions that are processed by the computer's central processing unit (CPU). Computer memory comes in different types, each serving a specific purpose in the functioning of a computer system. Here are the main types of computer memory:

Primary Memory (Main Memory):

1. **Random Access Memory (RAM):** RAM is a type of volatile memory that the computer uses to store data and program instructions that are currently being used or processed. It is volatile memory, meaning it loses its contents when the power is turned off or the computer is restarted. RAM provides fast access to data and allows the CPU to read and write data quickly.

2. **Cache Memory:** Cache memory is a small-sized type of volatile computer memory that provides high-speed data storage and access to the processor. It stores frequently accessed data and instructions to reduce the time it takes for the CPU to access this information.

Secondary Memory (Storage Memory):

1. **Hard Disk Drive (HDD):** Hard drives are non-volatile storage devices that store data magnetically on rapidly rotating disks. They provide large storage capacities and are commonly used for long-term data storage in computers.

2. **Solid-State Drive (SSD):** SSDs are a type of non-volatile storage that stores data on memory chips. They are faster, more reliable, and consume less power than traditional hard disk drives. SSDs are commonly used in laptops, desktops, and servers for storage.

3. **Flash Memory:** Flash memory is a non-volatile memory type that retains data even when the power is turned off. It is commonly used in USB drives, memory cards, and solid-state drives (SSDs) due to its durability and speed.

Read-Only Memory (ROM):

1. **BIOS (Basic Input/Output System):** BIOS is a type of non-volatile memory that stores the basic instructions required to boot the computer and initiate the hardware components. It is usually stored on a chip on the computer's motherboard.

2. **Firmware:** Firmware is a type of ROM that contains specific instructions for the hardware device. It is used in devices such as printers, routers, and digital cameras to provide low-level control for the hardware.

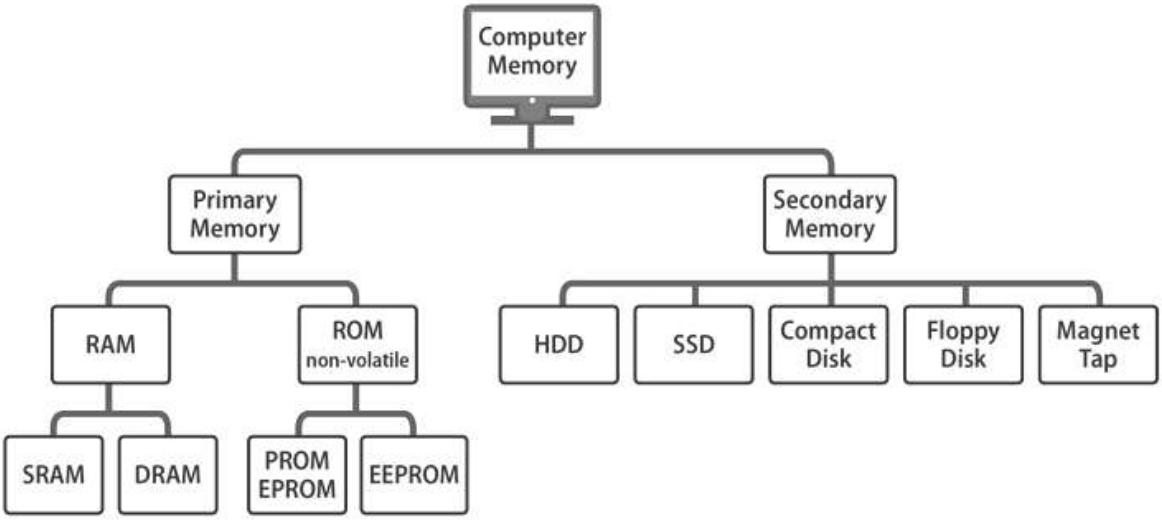


Fig: Computer memory

Hardware and software

Hardware and software are two fundamental components of any computer system. They work together to enable the computer to perform various tasks and execute programs. Here are the key concepts of hardware and software:

Hardware:

1. **Physical Components:** Hardware refers to the physical components of a computer or electronic device. These components are tangible and include the central processing unit (CPU), memory modules, storage devices, input and output devices, and the motherboard, among others.

2. **CPU (Central Processing Unit):** The CPU is the "brain" of the computer, responsible for executing instructions and performing calculations. It processes data and controls the operation of the entire system.

3. **Memory (RAM):** Random Access Memory (RAM) is a type of volatile memory that stores data and program instructions while the computer is running. It provides fast access for the CPU to read and write data.

4. **Storage Devices:** Storage hardware includes devices like hard disk drives (HDDs) and solid-state drives (SSDs), which are used to store data and programs. HDDs store data on spinning disks, while SSDs use flash memory for storage.

5. **Input Devices:** Input hardware includes devices such as keyboards, mice, touchscreens, and microphones that allow users to provide data and instructions to the computer.

6. **Output Devices:** Output hardware includes devices like monitors, printers, and speakers, which present data and information to the user in a human-readable form.

7. **Motherboard:** The motherboard is the main circuit board of a computer, connecting and facilitating communication between various hardware components. It contains the CPU socket, RAM slots, and connectors for expansion cards.

8. **Expansion Cards:** These are hardware components that can be added to the motherboard to enhance the computer's capabilities, such as graphics cards, sound cards, and network cards.

Software:

1. **Programs and Instructions:** Software consists of programs, applications, and sets of instructions that tell the computer what to do. It is not tangible but exists in the form of code and data.

2. **Operating System (OS):** The operating system is a fundamental software component that manages the hardware, provides user interfaces, and allows applications to run. Common operating systems include Windows, macOS, and Linux.

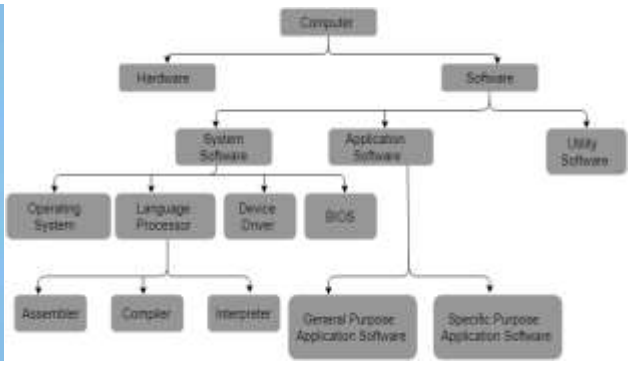
3. **Application Software:** Application software includes programs that are designed for specific tasks, such as word processors (Microsoft Word), web browsers (Google Chrome), and multimedia players (VLC Media Player).

4. **Utility Software:** Utility software performs various maintenance and optimization tasks, such as antivirus software, disk defragmenters, and backup utilities.

5. **Programming Languages:** Software development often involves using programming languages like Python, Java, C++, and others to create applications and software solutions.

6. **Firmware:** Firmware is a type of software that is stored on hardware devices and provides low-level control and instructions for their operation. For example, firmware on a computer's motherboard or a printer's control panel.

7. **Open Source vs. Proprietary Software:** Software can be open source (freely accessible and modifiable by the community) or proprietary (commercially developed and controlled by a company). Examples of open-source software include Linux and the Mozilla Firefox browser.



Operating system

An operating system (OS) is a critical software component that manages and controls the hardware and software resources of a computer. It serves as an intermediary between the user, application software, and the computer's hardware, facilitating the execution of tasks and providing a user-friendly interface. There are different operating system which are given below:

1. **Desktop Operating Systems:**
    - **Microsoft Windows:** Windows is one of the most widely used desktop operating systems. Examples include Windows 10 and Windows 11.
    - **macOS:** Developed by Apple Inc., macOS is the operating system for Apple Macintosh computers.
    - **Linux (Various Distributions):** Linux is an open-source operating system available in various distributions, such as Ubuntu, Fedora, and CentOS.
2. **Server Operating Systems:**
    - **Windows Server:** Microsoft also offers server versions of its operating system, such as Windows Server 2019 and Windows Server 2022.
    - **Linux (Various Server Distributions):** Linux is a popular choice for server environments, with distributions like CentOS, Red Hat Enterprise Linux, and Debian.
    - **Unix:** Unix-based operating systems like AIX (IBM) and Solaris (formerly Sun Microsystems) are used in enterprise server environments.
3. **Multi-User and Time-Sharing Systems:**

- **Unix:** Unix-based operating systems like Linux and macOS are designed for multiple users and support time-sharing environments.
- **Windows Server:** Windows Server operating systems can be configured for multi-user environments.

4. **Single-User and Standalone Systems:**
    - **DOS (Disk Operating System):** MS-DOS is an example of a single-user operating system used in older personal computers.

Fig: Different types of operating system

Running an application in computer

To run an application on a computer:

1. ➞ **Turn on your computer**
    - Ensure your computer is powered on and the operating system is up and running.
2. ➞ **Log In:**
    - If your computer requires a login or password, enter your credentials to access the desktop.
3. ➞ **Locate the Application**
    - Depending on your operating system, you can usually find applications in the following locations:

- **Windows:** Look for application icons on the desktop, in the Start menu, or in the taskbar. You can also use the Windows Search feature to find and run applications.
- **macOS:** Look for the application icon in the Dock, the Applications folder, or use Spotlight Search to find and run applications.
- **Linux:** Applications can be located in the system menu or launcher, or you can use a terminal to run them.

4. ➞ **Launch the Application**
    - Click on the application icon or use the associated keyboard shortcut, if available, to open the application. Alternatively, you can use the command-line interface on some operating systems to run applications.
5. ➞ **Wait for the Application to Load**
    - The application may take a moment to load, especially if it's a larger program. During this time, you might see a splash screen or loading animation.
6. ➞**Use the Application**
    - Once the application is loaded, you can start using it. Follow the on-screen instructions and interact with the software as intended.
7. ➞ **Close the Application**
    - When you're done with the application, you can usually close it by clicking the "X" button in the top right corner (macOS) or top left corner (Windows), or by selecting "File" > "Exit" or "File" > "Close" from the application's menu. Some applications may require you to save your work before closing.
8. ➞ **Minimize or Switch Between Applications**
    - You can minimize an application to the taskbar or dock, or switch between open applications using the task switcher or Alt+Tab (Windows), Mission Control (macOS), or the appropriate keyboard shortcuts on Linux.
9. ➞ **Shut Down or Restart the Computer**
    - When you're finished using your computer, you can shut it down or restart it. This is typically done through the Start menu or system menu on your operating system.

Viewing of file in computer

Here are the steps to view a file on a computer:

1. **→Turn on your Computer**
    - Ensure your computer is powered on and the operating system is up and running.
2. **→Log In**
    - If your computer requires a login or password, enter your credentials to access the desktop.
3. **→Locate the File**
    - Navigate to the location where the file is stored. This can be on your desktop, in a specific folder, or in a file explorer window.
4. **→Double-Click the File**
    - Locate the file you want to view, and double-click on it. Alternatively, you can right-click and choose "Open" or "Open with" if there are multiple programs that can open the file type.
5. **→Wait for the File to Open**
    - Depending on the file type and the associated application, the file will open in the appropriate software (e.g., a document in a word processor, an image in a viewer, a video in a media player).
6. **→View and Interact with the File**
    - Once the file is open, you can view and interact with its contents using the features and tools provided by the application. For example, you can read, edit, or play the file as needed.
7. **→Close the File**
    - When you're done viewing the file, you can usually close it by clicking the "X" button in the top right corner of the application window. Some applications may require you to save any changes before closing.
8. **→Minimize or Switch Between Open Files**

- If you have multiple files open, you can minimize the current file or switch between open files using the application's window management features.

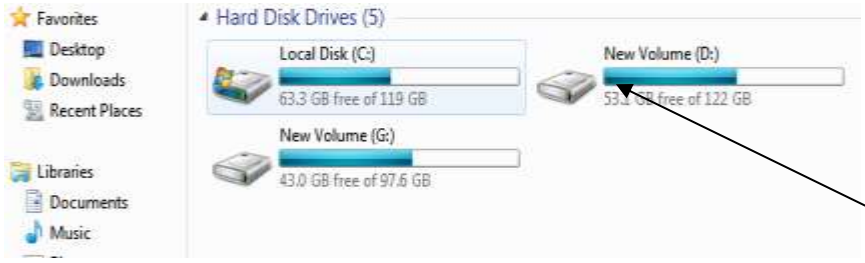
9. **➞Shut Down or Restart the Computer**

- When you're finished using your computer, you can shut it down or restart it. This is typically done through the Start menu or system menu on your operating system.

Step 1

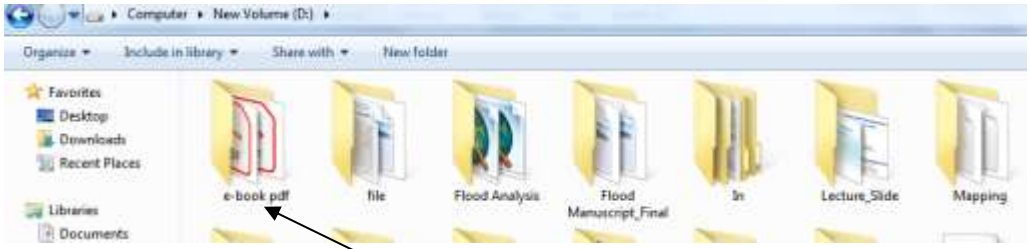
Double click on computer/This PC on Desktop

Step 2

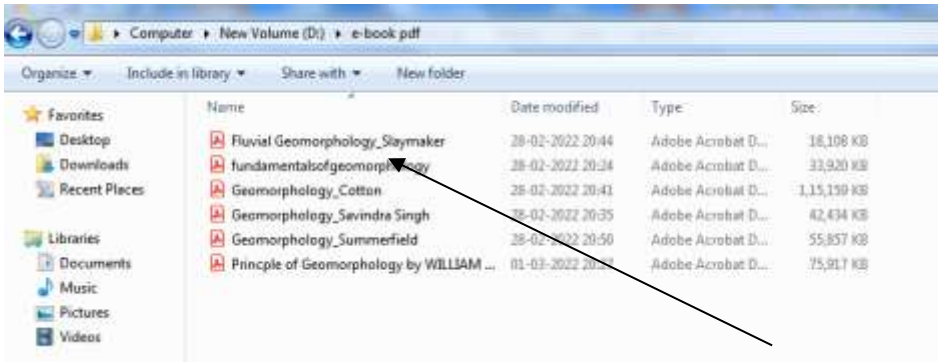


Double click on drive

Step 3



Step 4 Double click on folder



Here are the files which have stored before

Viewing of folder in computer

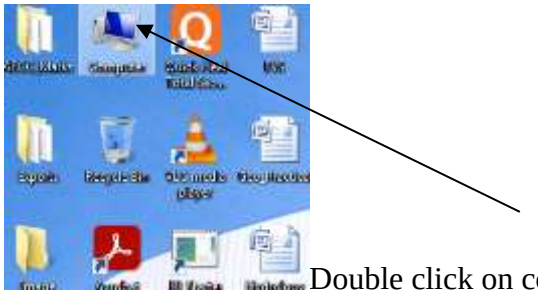
Here are the steps with arrows to create a folder on your computer:

1. **➞Turn on your Computer:**
    - Ensure your computer is powered on and the operating system is up and running.
2. **➞Log In:**
    - If your computer requires a login or password, enter your credentials to access the desktop.
3. **➞Locate File Explorer or Finder:**
    - Open the File Explorer (Windows) or Finder (macOS) application. This is typically found in the taskbar (Windows) or the dock (macOS), or you can use the Start menu (Windows) or the Applications folder (macOS) to find and open it.
4. **➞Navigate to the Location:**
    - Use File Explorer or Finder to navigate to the location where you want to create the folder. This can be your desktop, a specific folder, or an external storage device.
5. **➞Create a New Folder:**
    - Right-click in the file explorer window, select "New," and choose "Folder" to create a new folder. Give it a descriptive name.
6. **➞Name the Folder:**

- After creating the folder, a default name is usually selected. Click on the default name to edit it and enter a descriptive name for your new folder.

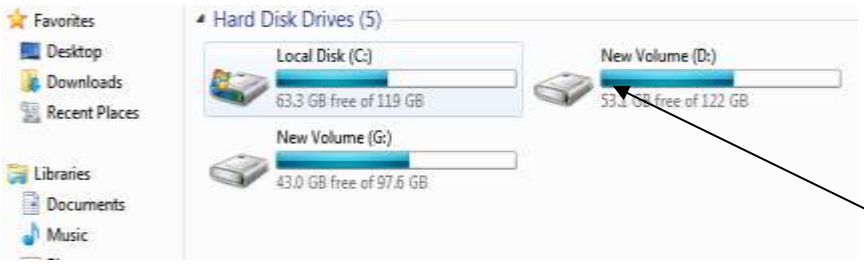
7. **➞Press Enter:**
   - After naming the folder, press the Enter key to save the new name.
8. **➞Use the New Folder:**
   - You can now use the new folder to organize and store files. You can drag and drop files into it, create subfolders within it, or perform other organizational tasks.
9. **➞Close File Explorer or Finder:**
   - When you're done working with the new folder, you can close the File Explorer or Finder application.
10. **➞Shut Down or Restart the Computer:**
    - When you're finished using your computer, you can shut it down or restart it. This is typically done through the Start menu or system menu on your operating system.

Step 1



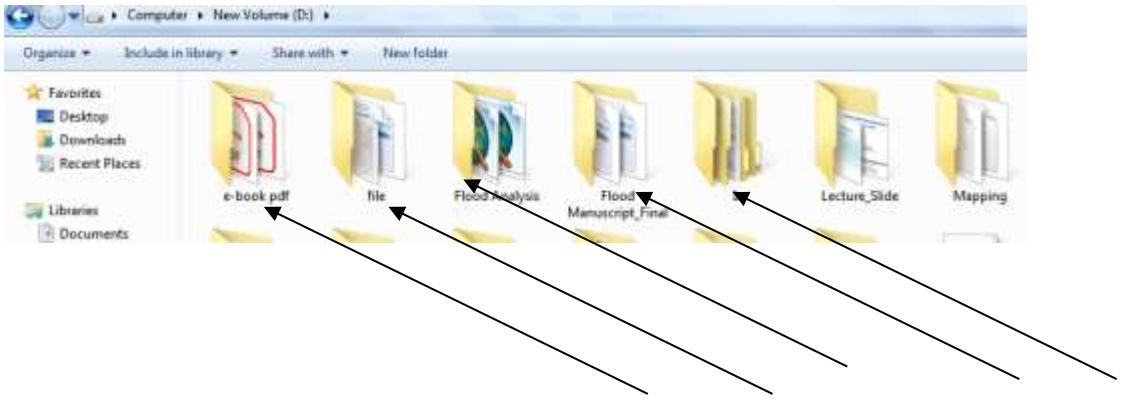
Double click on computer/This PC on Desktop

Step 2



Double click on drive

Step 3



Here are the folders which have created before

Viewing of directories in computer

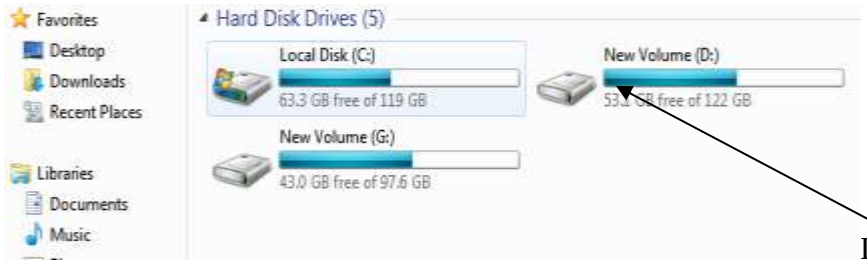
1. **Turn on your Computer:**
    - Ensure your computer is powered on and the operating system is up and running.
2. **➞ Log In:**
    - If your computer requires a login or password, enter your credentials to access the desktop.
3. **➞ Locate File Explorer or Finder:**
    - Open the File Explorer (Windows) or Finder (macOS) application. This is typically found in the taskbar (Windows) or the dock (macOS), or you can use the Start menu (Windows) or the Applications folder (macOS) to find and open it.
4. **➞ Navigate to the Location:**
    - Use File Explorer or Finder to navigate to the location where you want to work with directories. This can be your desktop, a specific folder, or an external storage device.
5. **➞ Create a New Directory:**
    - Right-click in the file explorer window, select "New," and choose "Folder" to create a new directory. Give it a descriptive name.
6. **➞ Name the Directory:**
    - After creating the directory, a default name is usually selected. Click on the default name to edit it and enter a descriptive name for your new directory.

7. ➞ **Press Enter:**
    - After naming the directory, press the Enter key to save the new name.
8. ➞ **Use the New Directory:**
    - You can now use the new directory to organize and store files. You can drag and drop files into it, create subdirectories within it, or perform other organizational tasks.
9. ➞ **Navigate and Organize Files:**
    - Within the opened directory, you can view, organize, and interact with files and subdirectories. You can create, move, copy, delete, and rename files and directories as needed.
10. ➞ **Navigate Back and Forth:**
    - Use the navigation buttons or breadcrumbs in File Explorer or Finder to move back and forth between directories.
11. ➞ **Close File Explorer or Finder:**
    - When you're done working with directories, you can close the File Explorer or Finder application.
12. ➞ **Shut Down or Restart the Computer:**
    - When you're finished using your computer, you can shut it down or restart it. This is typically done through the Start menu or system menu on your operating system.

Step 1

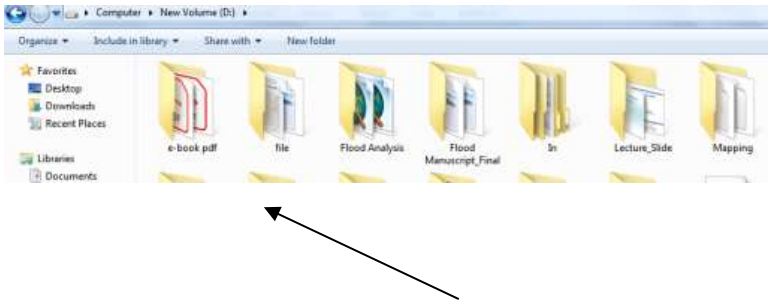
Double click on This PC on Desktop

Step 2

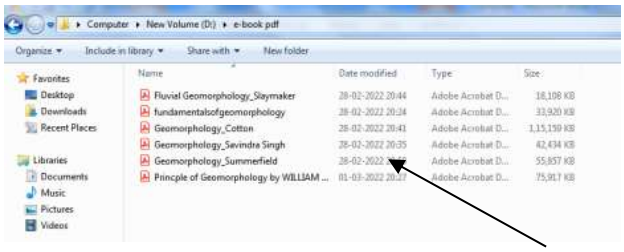


Double click on drive

Step 3



Step 4 Double click on folder



Here are the files which have stored before

This is the directory

Creating and renaming of files and folders

Creating a File or Folder:

1. ➞ **Turn on your Computer:**
    - Ensure your computer is powered on and the operating system is up and running.
2. ➞ **Log In:**

- If your computer requires a login or password, enter your credentials to access the desktop.

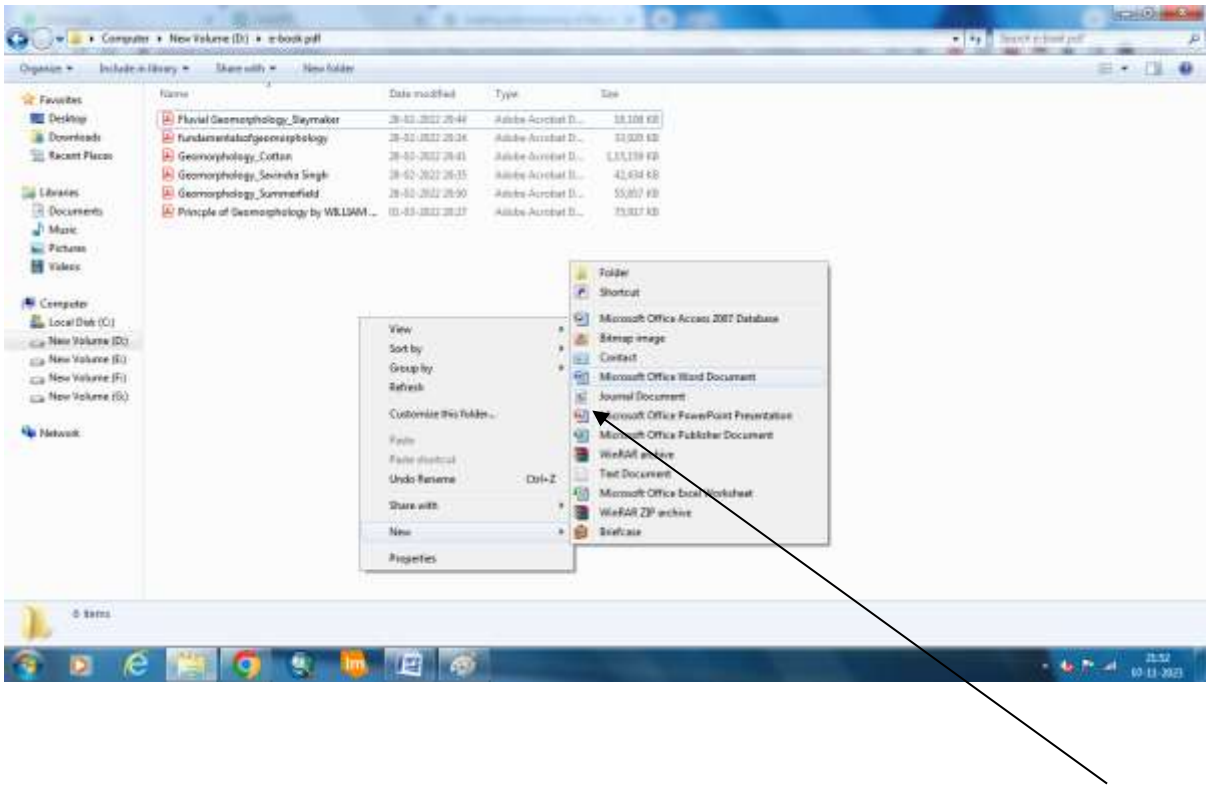
3. ➞ **Locate File Explorer or Finder:**
    - Open the File Explorer (Windows) or Finder (macOS) application. This is typically found in the taskbar (Windows) or the dock (macOS), or you can use the Start menu (Windows) or the Applications folder (macOS) to find and open it.
4. ➞ **Navigate to the Location:**
    - Use File Explorer or Finder to navigate to the location where you want to create the file or folder. This can be your desktop, a specific folder, or an external storage device.
5. ➞ **Create a New File or Folder:**
    - Right-click in the file explorer window, select "New," and choose "Folder" to create a new folder or "File" to create a new file. Give it a descriptive name.
6. ➞ **Name the File or Folder:**
    - After creating the file or folder, a default name is usually selected. Click on the default name to edit it and enter a descriptive name for your new file or folder.
7. ➞ **Press Enter:**
    - After naming the file or folder, press the Enter key to save the new name.
8. ➞ **Use the New File or Folder:**
    - You can now use the new file or folder to organize and store data. For folders, you can create subfolders or store files within them. For files, you can open and edit them with the appropriate software.

Renaming a File or Folder:

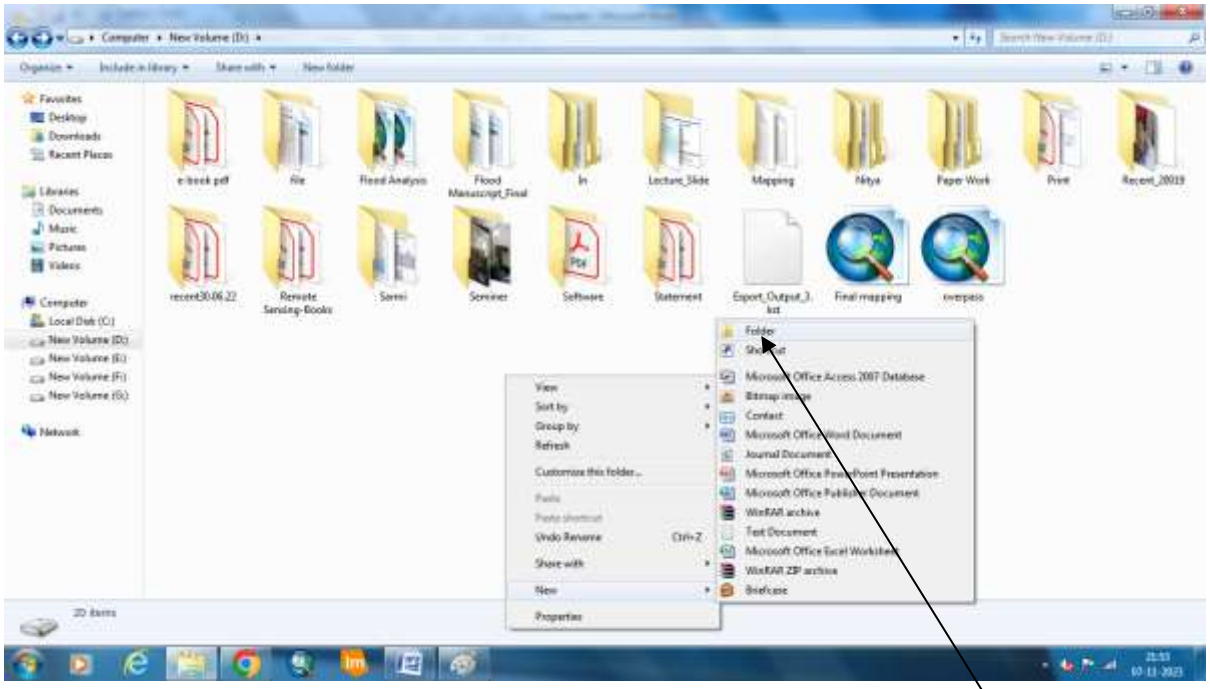
1. ➞ **Locate the File or Folder:**
    - Navigate to the location where the file or folder you want to rename is stored.
2. ➞ **Select the File or Folder:**
    - Click once on the file or folder to select it. For renaming multiple files or folders, use the Ctrl key (Windows) or Command key (macOS) while selecting.
3. ➞ **Right-click and Choose Rename:**

- Right-click on the selected file or folder, and choose the "Rename" or "Get Info" option. Alternatively, you can usually press the F2 key (Windows) or Return key (macOS) to enter rename mode.

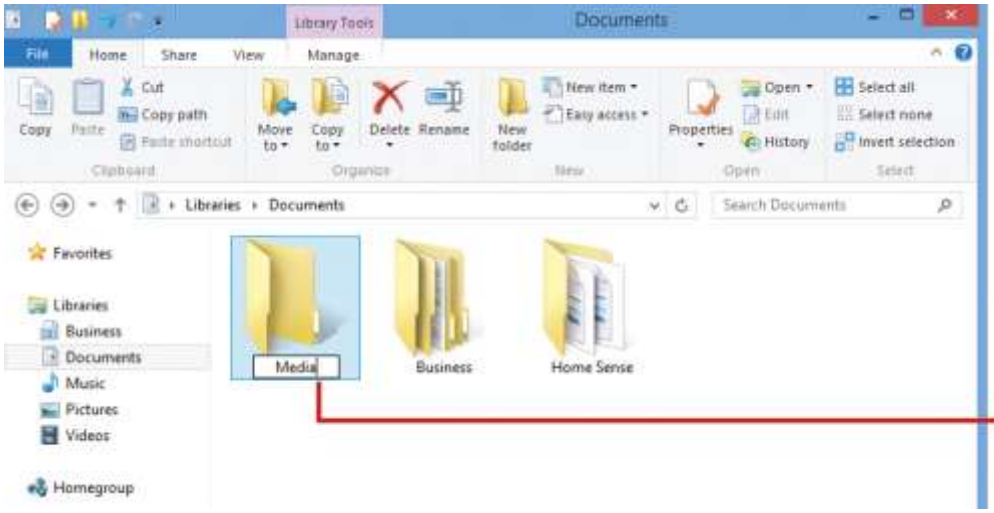
4. ➞ **Edit the Name:**
    - Edit the name of the file or folder directly. Make sure to use a descriptive name.
5. ➞ **Press Enter:**
    - After editing the name, press the Enter key to save the new name.
6. ➞ **Use the Renamed File or Folder:**
    - The file or folder is now renamed and can be used as needed.



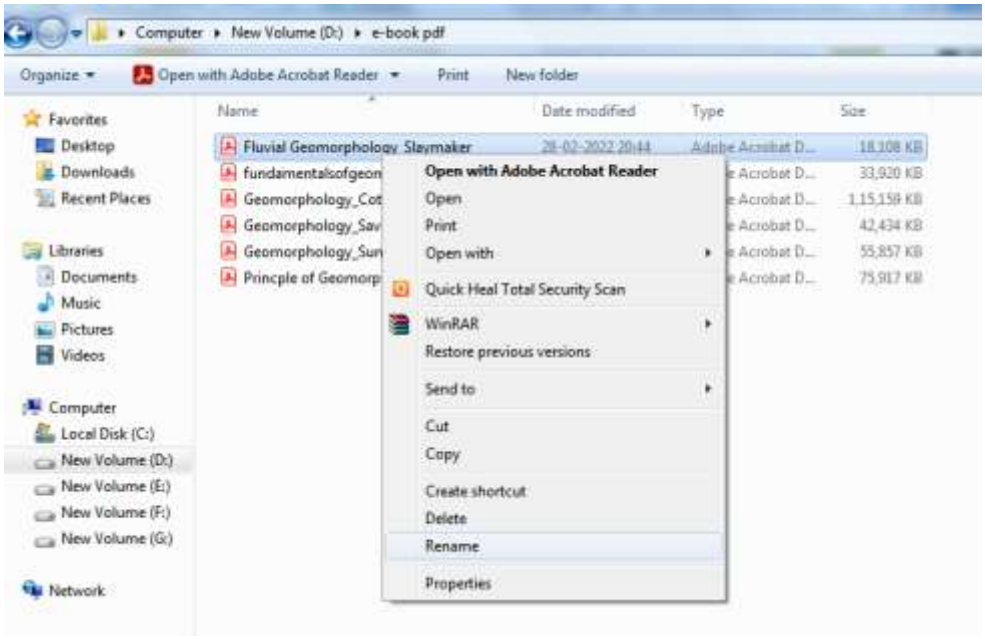
Creating files

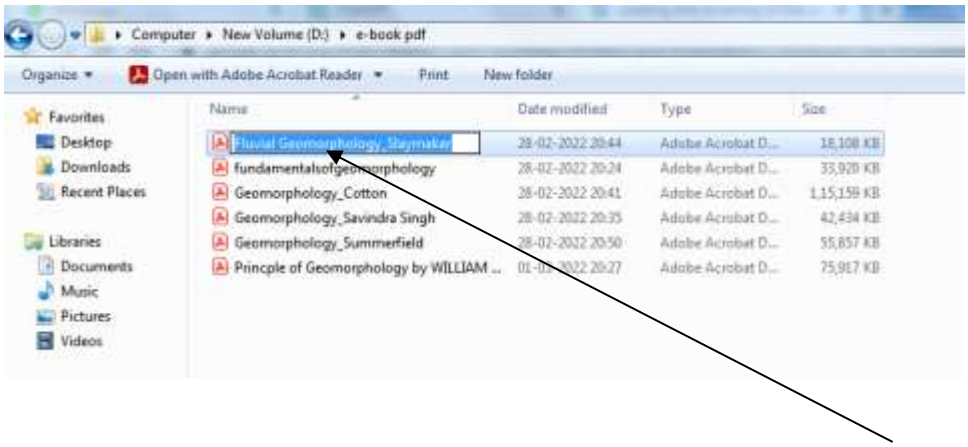


Creating folder



Renaming folder





Renaming file

2. Understanding word processing.

Microsoft Office is a suite of productivity software applications developed by Microsoft Corporation. It is one of the most widely used office software suites in the world and is available for both Windows and macOS operating systems. Microsoft Office includes a variety of applications that are commonly used for tasks such as word processing, spreadsheet calculations,

creating presentations, email management, and more. Some of the core applications included in Microsoft Office typically consist of:

Microsoft Word: A word processing application used for creating, editing, and formatting text documents. It is commonly used for tasks like creating letters, reports, and documents.

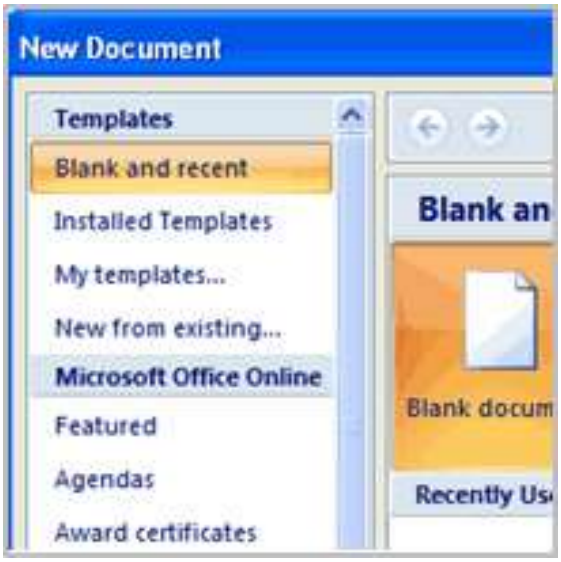
Microsoft Excel: A spreadsheet program used for data analysis, calculations, and creating charts and graphs. It's widely used for tasks involving financial modeling, data analysis, and more.

Microsoft PowerPoint: A presentation software that allows users to create slideshows with text, images, videos, and animations. It's often used for creating business presentations and educational materials etc. as per our syllabus we learn MS **W**ord, E**x**cel and **P**owerPoint.

How to Start Microsoft Office (**Word Excel and PowerPoint**) in your PC:

- Click the "Start" button.
- Navigate to the "All Programs" or "All Apps" menu.
- Find and click on the Microsoft Office folder, and then select the application you want to open.

Introduction of MS Word:



Now days Microsoft Word has become an essential tool for a wide range of users, from students and professionals to writers and businesses, for creating and editing documents, reports, letters, and more. It continues to evolve with new features and updates, and it is widely used for a variety of document-related tasks.

Microsoft Word is a word processing software application developed by Microsoft. It is part of the Microsoft Office suite of productivity software, which also includes programs like Excel, PowerPoint, and Outlook. Microsoft Word is one of the most widely used word processing applications in the world, and it is available for both Windows and Mac operating systems.

Application of MS Word:

Document Formatting: Word provides extensive tools for formatting documents, including setting margins, adjusting line spacing, creating headers and footers, and applying various styles and themes to make your documents visually appealing.

Text Editing: Word allows users to create, edit, and format text documents. You can type and format text, change fonts, styles, and sizes, and use features like spell check and grammar checking.

Tables and Charts: Word supports the creation of tables and the insertion of charts and graphs to represent data visually.

Page Layout: Users can customize the layout of their documents, including page orientation (portrait or landscape), page size, and the number of columns on a page.

Spell Check and Grammar Check: The application includes spelling and grammar checkers to help users identify and correct errors in their documents.

Collaboration: Microsoft Word supports real-time collaboration, allowing multiple users to work on a document simultaneously, whether through the desktop application or the online version known as Word Online.

Templates: Word offers a variety of templates for common document types, such as resumes, letters, reports, and more. Users can start with a template and customize it to their needs.

Mail Merge: Word includes a feature for creating and managing mail merges, which is useful for generating personalized letters, envelopes, and other documents in bulk.

Integration: It can seamlessly integrate with other Microsoft Office applications, making it easy to incorporate data from Excel or add visuals from PowerPoint into your documents.

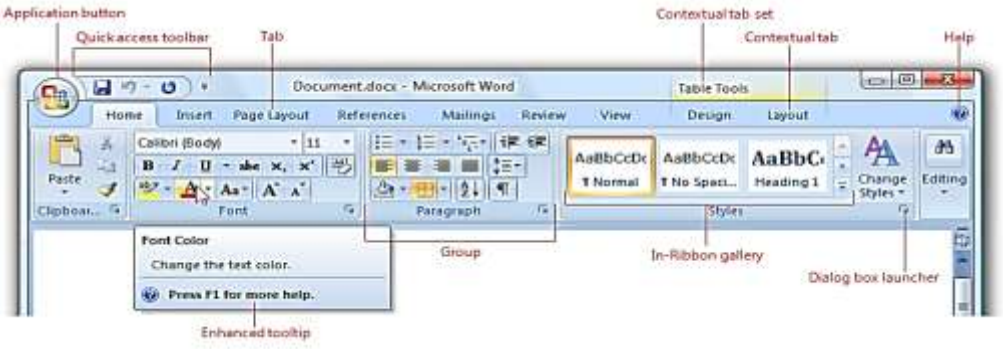
File Formats: Word can open and save documents in various file formats, including its native .docx format, older .doc format, and common formats like PDF.

Microsoft Office Word ribbon:

The ribbon interface replaced the traditional menu and toolbar system used in older versions of Word and other Office applications. It was designed to make it easier to find and use the various features of the program, and it can be customized to some extent to suit your workflow and preferences.

MS Office Word ribbon:

Tabs: The ribbon is organized into a set of tabs, each of which represents a different set of functions or features. The default tabs in Word include "File," "Home," "Insert," "Design," "Page Layout," "References," "Mailings," "Review," and "View." The specific tabs available may vary based on your Word version and settings.



Groups: Within each tab, you'll find groups of related commands. For example, the "Home" tab might have groups like "Clipboard," "Font," "Paragraph," and "Styles." These groups contain various tools and options related to the respective functions.

Commands: Commands are the individual tools and options that you can use to perform specific tasks. These commands can be found within the groups on each tab. Examples of commands include "Bold," "Italic," "Copy," "Paste," "Insert Table," and "Spell Check."

Contextual tabs: In addition to the default tabs, Word also has contextual tabs that appear when you select certain objects in your document. For instance, when you click on a table or an image, you'll see a "Table Tools" or "Picture Tools" tab that provides commands specific to working with tables or images.

Quick Access Toolbar: Located above the ribbon, the Quick Access Toolbar allows you to add your most frequently used commands for quick access. You can customize this toolbar by adding or removing buttons.

Search box: Some versions of Word include a search box on the ribbon, which lets you search for specific commands or features. This can be particularly helpful if you're not sure which tab or group a specific command is located in.

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3. Using spreadsheet: basics of spreadsheet; manipulation of cells; formulas and functions; editing of spreadsheet, printing of spreadsheet.

Microsoft Excel

Microsoft Excel is a spreadsheet application developed by Microsoft as a part of the Microsoft suite. Excel is one of the most widely used spreadsheet software in the world and is known for its powerful data analysis and visualization capabilities. It is available for both Windows and macOS operating systems. Microsoft regularly updates Excel with new features and improvements, so the software has evolved significantly over the years. Users can access a wide range of templates, functions, and add-ins to tailor Excel to their specific needs. Whether you're a student, professional, or business user, Excel is a versatile tool for managing, analyzing, and presenting data.

Excel allows users to create and work with spreadsheets, which are grids of cells organized in rows and columns. You can use Excel for various tasks, including:

Data Entry: You can enter and organize data in a structured format within cells.

Data Analysis: Excel provides various functions and tools to perform calculations, analyze data, and generate insights.

Charting and Graphing: Excel can create various types of charts and graphs to visualize data, making it easier to understand and present information.

Data Modeling: You can use Excel to build complex data models, perform "What-If" analysis, and create financial models.

Budgeting and Financial Planning: Many individuals and businesses use Excel for budgeting, financial planning, and tracking expenses.

Data Sorting and Filtering: You can sort and filter data to quickly find specific information within a large dataset.

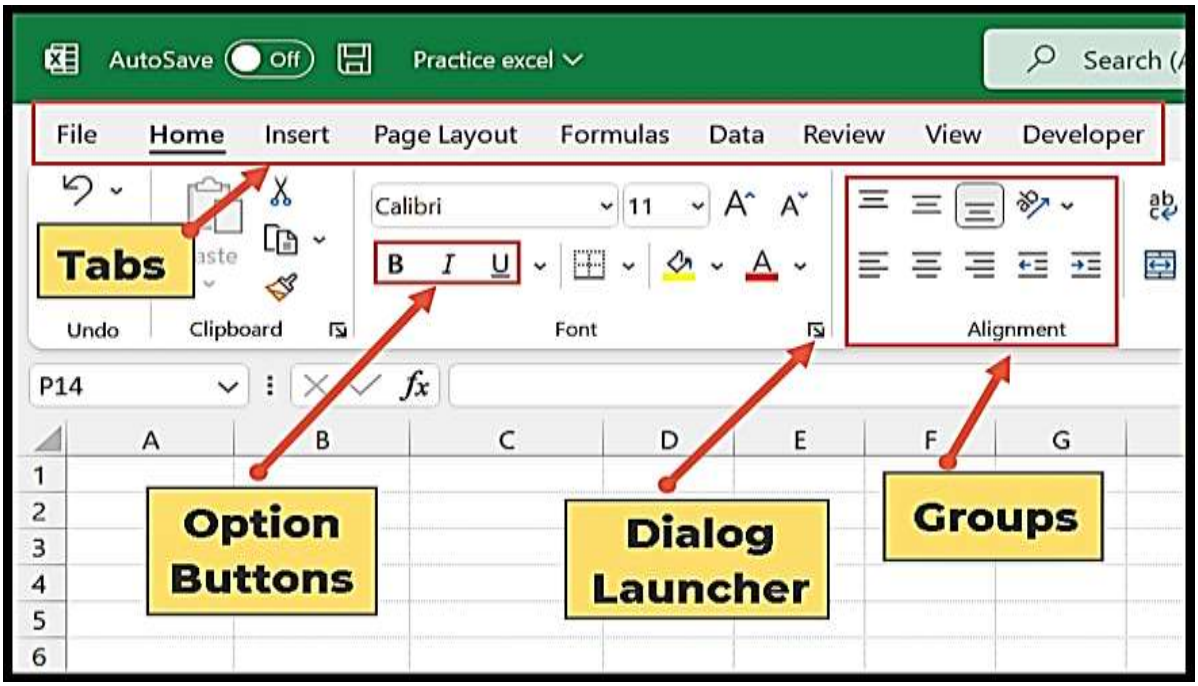
Collaboration: Excel allows multiple users to collaborate on a spreadsheet, either in real-time through Microsoft 365 or by sharing files.

Automation: Excel supports macros and Visual Basic for Applications (VBA), enabling users to automate repetitive tasks and customize Excel's functionality.

Data Import and Export: Excel can import data from various sources, including databases and external files, and export data to different formats.

PivotTables: PivotTables are a powerful feature for summarizing and analyzing large datasets, making it easier to extract insights from complex data.

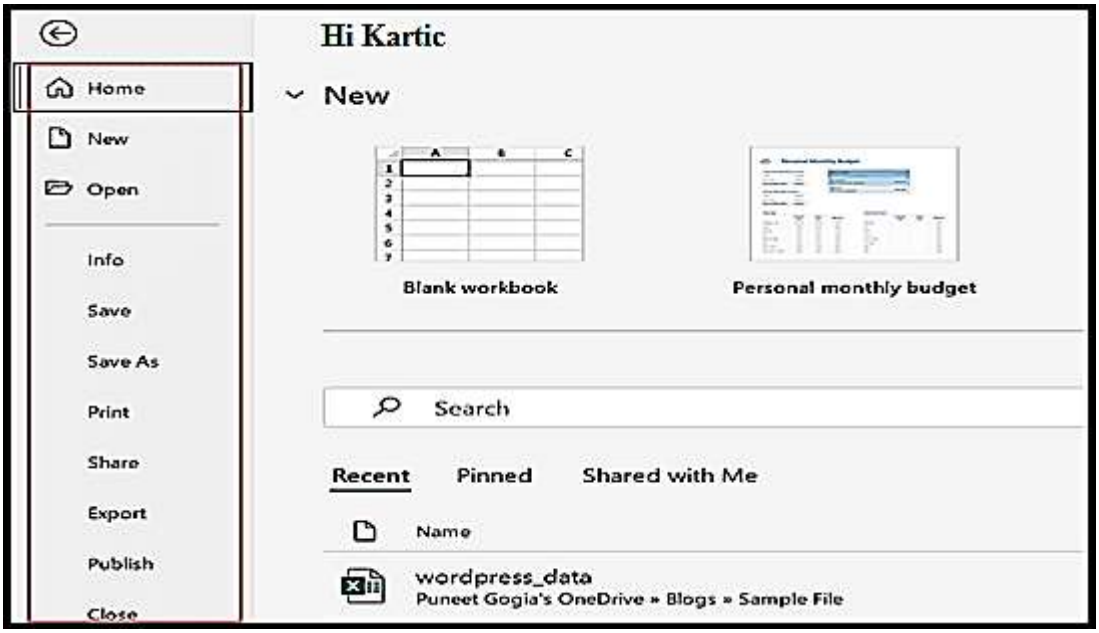
Microsoft Excel ribbon is the row of tabs and icons at the top of the Excel window that allows you to quickly find, understand and use commands for completing a certain task. It looks like a kind of complex toolbar, which it actually is.



Excel Ribbon Tabs: In Excel, the ribbon has the below tabs:

1. File Tab

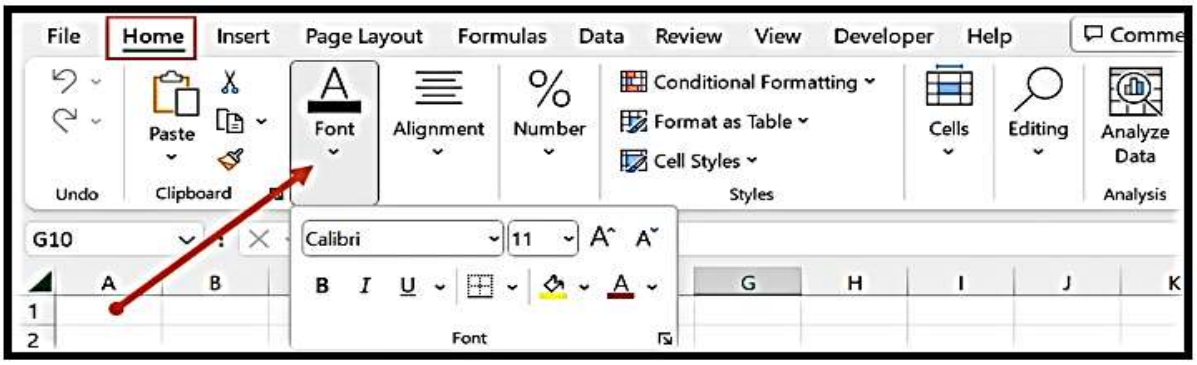
It gives you a backstage view of all important commands and options that are related to the files. It includes how to create a new worksheet, open a file, and save and print the files.



2. Home Tab

The Home tab is the default tab in Excel. It has the most frequently used options which have different groups like a clipboard, font, alignment, number, styles, cells, and editing.

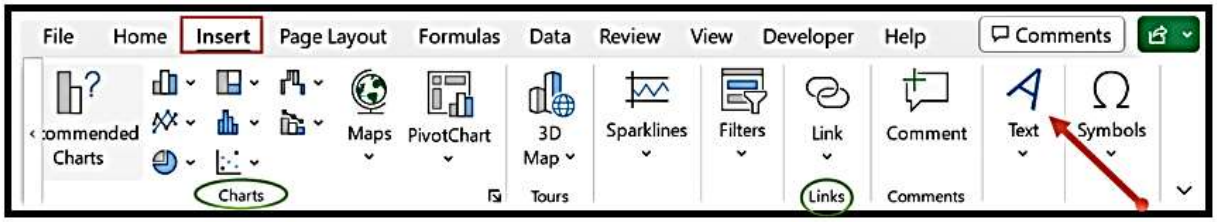
As, in the clipboard group, the cut, copy and paste commands are available. There is a font group that includes multiple formatting, font styles, colors, and sizes.



3. Insert Tab

It helps you to insert different objects like pivot tables, images, charts, shapes, hyperlinks, headers and footers, and special symbols in the sheet.

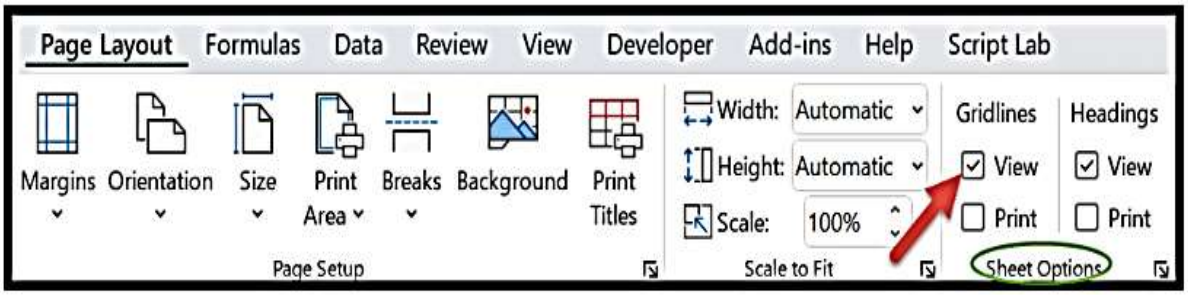
It allows you to insert the text box for adding the text and customize it by changing its outline and color.



4. Page Layout Tab

This tab helps you to customize the layout by adjusting the margins of the page to print it out.. It gives you access to select the orientation portrait and landscape.

The page layout tab provides you the option to remove the gridlines from the worksheet by unselecting the view gridlines option.



5. Formula Tab

The Formula tab helps you in working with formulas and functions which are in the group of function library.

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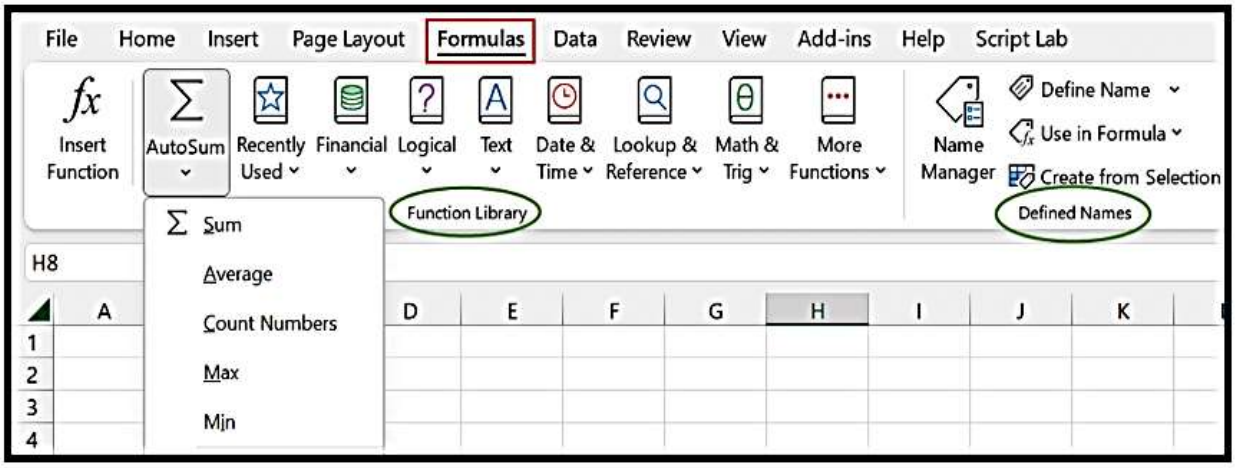
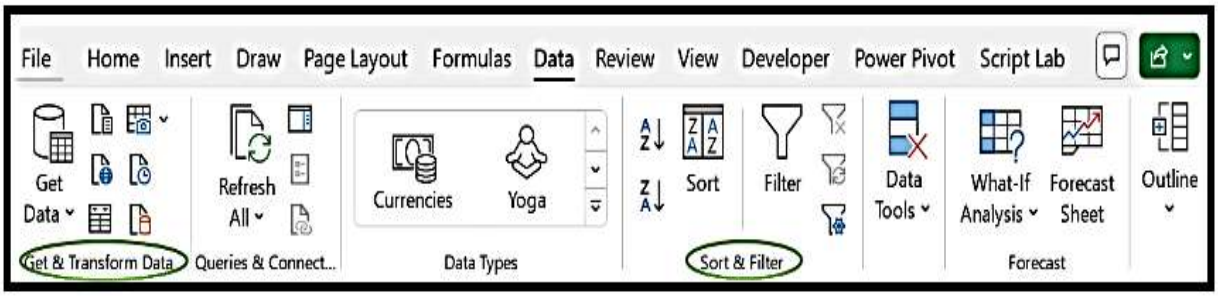
Use the auto-sum function to sum, average, and count the values and to find out the minimum or maximum value among the selected ones. The defined names group helps you to create a named range.



6. Data Tab

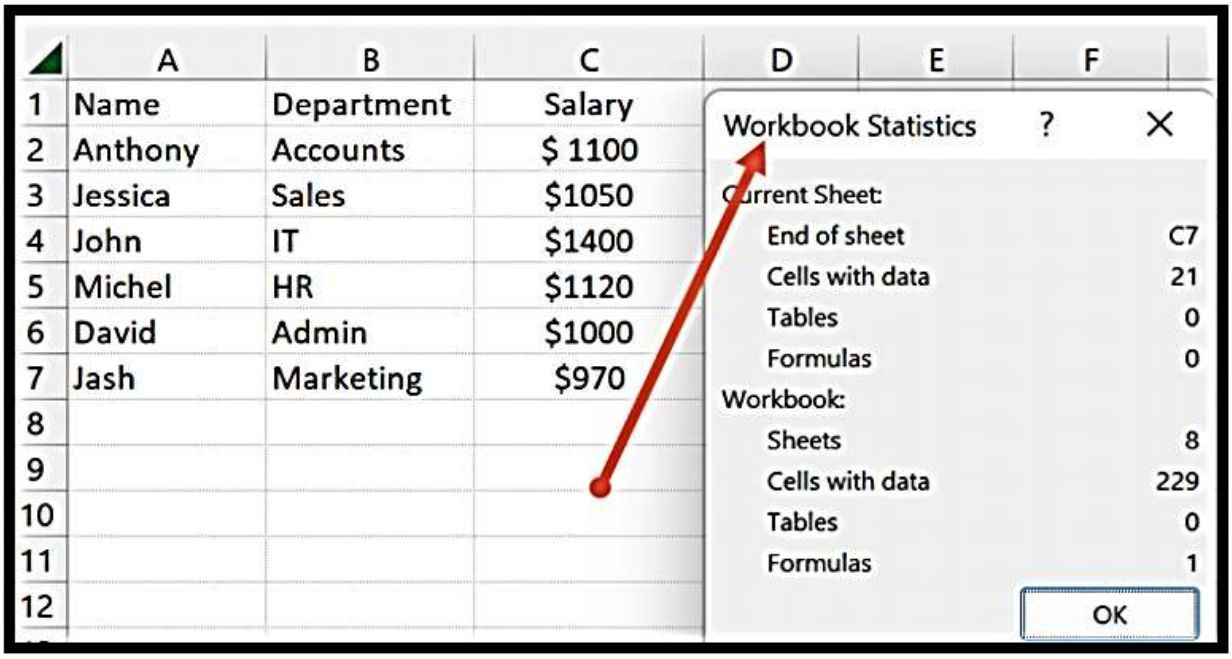
The data tab has all the options that allow you to clean and manage data. From here, you can access a power query that helps you to clean the data. Even it allows you to sort and filter your data.



7. Review Tab

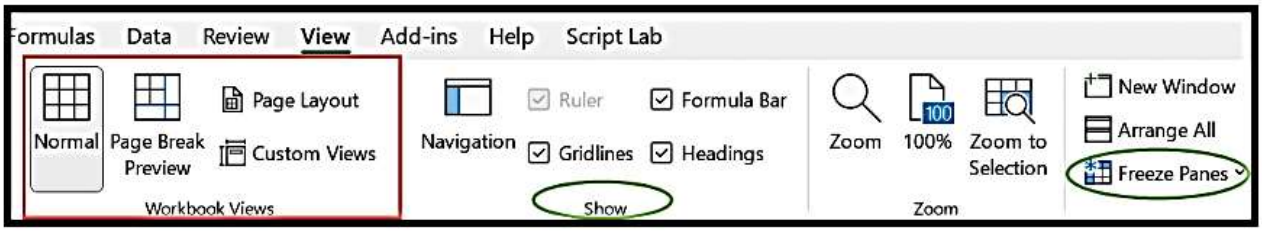
This allows you to spell check, translate the language, adding comments and notes to the worksheet.

In the workbook statistics dialog box; you will get all the details of the current sheet and workbook about the cells with data, the number of sheets, and the formulas that are used in it.



8. View Tab

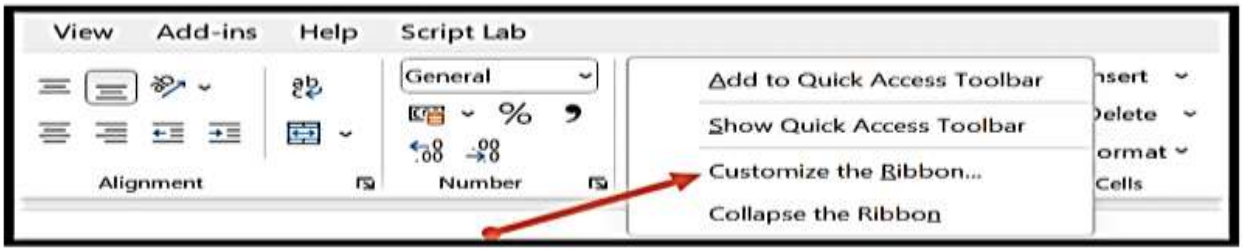
It provides you with several options to change the view from the workbook views- Page Break Preview, Normal view, and Page Layout view. It allows you to hide or unhide the Formula bar, and Headings from the worksheet. With the freeze panes option, you can freeze the selected rows and columns.



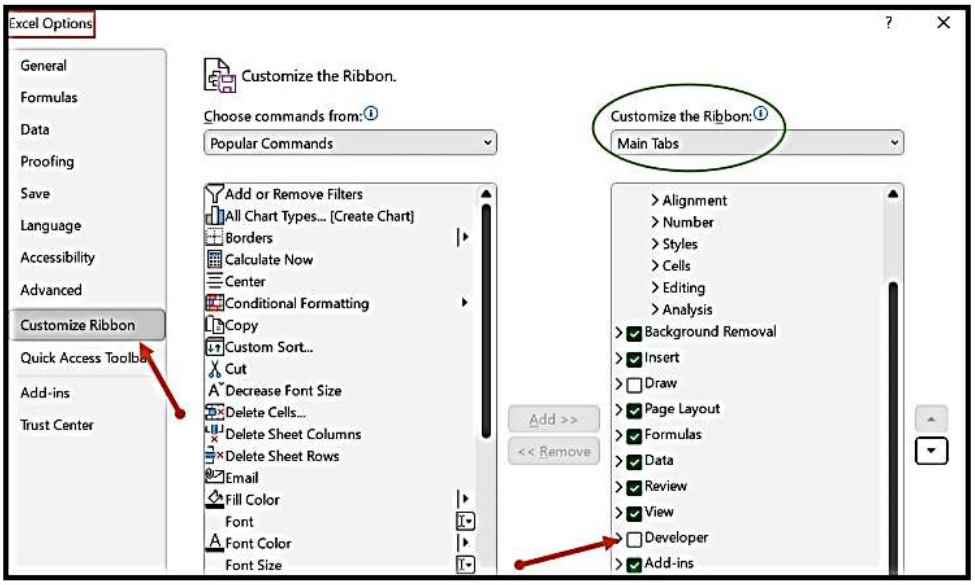
Activate or Deactivate a Tab from the Ribbon

There are a few tabs that are not active on the ribbon by default, like, the draw and developer tabs. And if you want to activate any of these, you can do it by using the customize option. Below are the steps.

First, right-click on the ribbon and select the customize the ribbon option.



Now, the Excel options dialog box appears.



Print setup and Printing a Worksheet

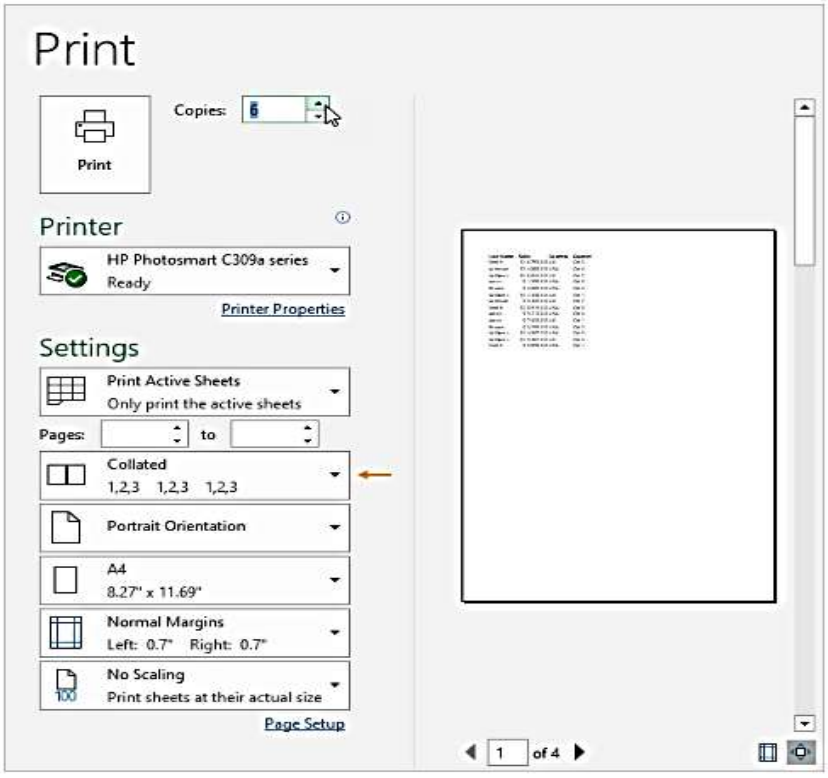
To print a worksheet in Excel, execute the following steps.

1. On the File tab, click Print.

2. To preview the other pages that will be printed, click 'Next Page' or 'Previous Page' at the bottom of the window.

3. To print the selection, click the big Print button.

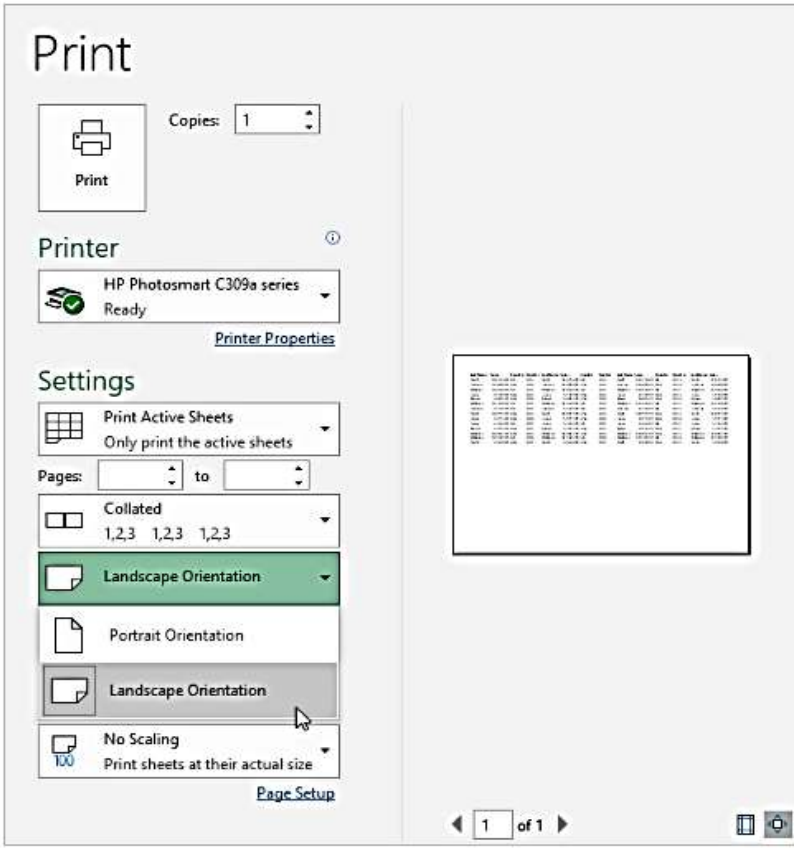
Multiple Copies: To print multiple copies, execute the following steps.



1. Use the arrows next to the Copies box.

2. If one copy contains multiple pages, you can switch between Collated and Uncollated. For example, if you print 6 copies, Collated prints the entire first copy, then the entire second copy, etc. Uncollated prints 6 copies of page 1, 6 copies of page 2, etc.

Orientation: You can switch between Portrait Orientation (more rows but fewer columns) and Landscape Orientation (more columns but fewer rows).

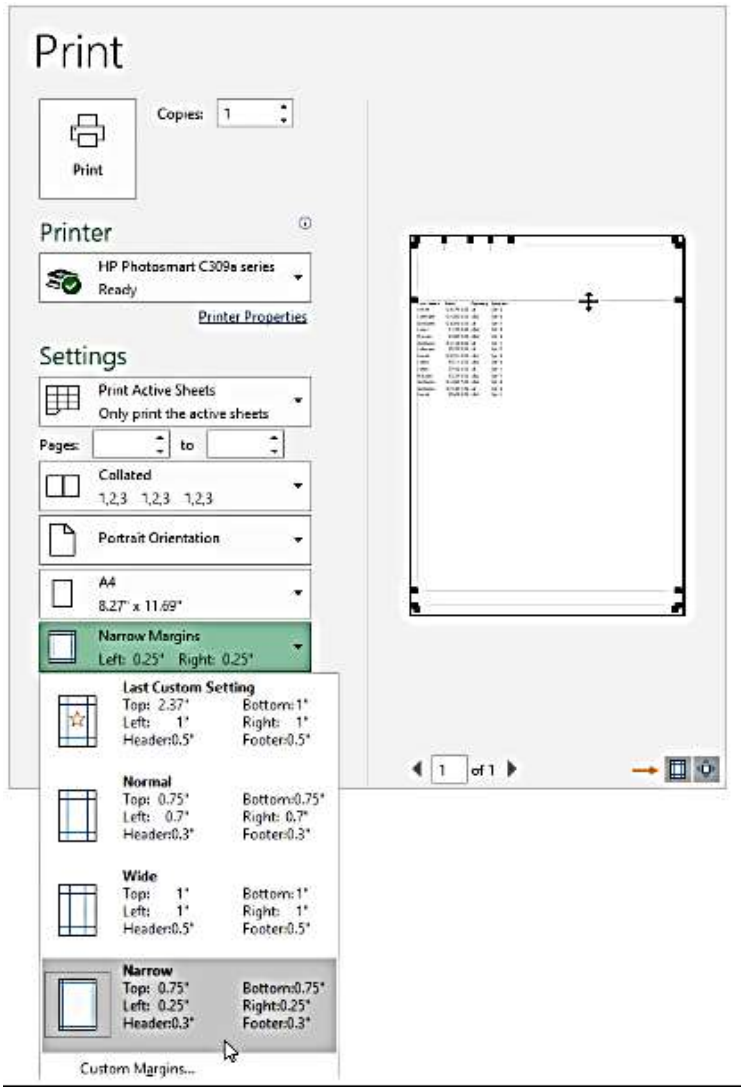


Page Margins

To adjust the page margins, execute the following steps.

1. Select one of the predefined margins (Normal, Wide or Narrow) from the Margins drop-down list.

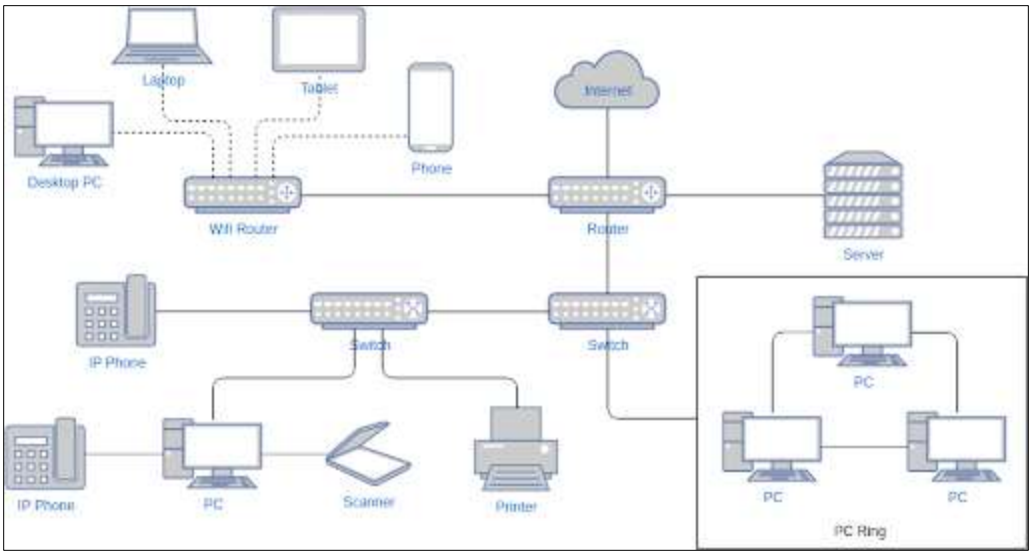
2. Or click the 'Show Margins' icon at the bottom right of the window. Now you can drag the lines to manually change the page margins.



4. Concept of internet; application of internet; World Wide Web; email.

What Is the Internet?

The internet is a global network of interconnected computers, servers, phones, and smart appliances that communicate with each other using the transmission control protocol (TCP) standard to enable a fast exchange of information and files, along with other types of services.



Source: Visual Paradigm Opens a new window

The internet is a global hub of computer networks — a network of connections wherein users at any workstation may, with authorization, receive data from every other system (and often interact with users working on other computers).

Internet infrastructure comprises optical fibre data transmission cables or copper wires, as well as numerous additional networking infrastructures, such as local area networks (LAN), wide area networks (WAN), metropolitan area networks (MAN), etc. Sometimes wireless services such as 4G and 5G or Wi-Fi necessitate similar physical cable installations for internet access.

Internet Corporation for Assigned Names and Numbers (ICANN) in the United States controls the internet and its associated technologies, such as IP addresses.

How was the internet developed?

The internet was first envisioned in the form of ARPANET by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969. The initial goal was to create a network that would enable users of a research computer at one institution to "communicate" with research computers at another institution. Since communications can be sent or diverted across several directions, ARPANet could continue to operate even if a military strike or any other calamity damages portions of the network.

ARPANET used the new packet switching technology to create low-cost, interactive interactions between computers, which generally communicate in short data bursts. Packet switching broke down large transmissions (or portions of computer data) into smaller, more manageable parts (called packets) that could travel independently across any accessible circuit to the destination

where they were reassembled. Consequently, unlike conventional voice services, packet switching doesn't require a separate dedicated connection between a pair of users.

In the 1970s, corporate packet networks were launched, although their primary purpose was to enable efficient access to distant computers through specialized terminals. They replaced expensive long-distance modem connections with "virtual" lines via packet networks.

Today, the internet is a globally accessible, collaborative, and self-sustaining public resource available to tens of millions of individuals. Countless people utilize it as their primary source of data consumption, spurring the development and expansion of their own community through social networking and content exchange. However, private versions of the internet do exist, which are primarily used by large organizations for secure and regulated information exchange.

Key features of the internet

The internet is a vast, interconnected network of computers and other network-enabled devices, which is:

- **Globally available**: The internet is an international service with universal access. People living in isolated areas of an archipelago or even in the depths of Africa can now access the internet.
- **Easy to use**: The software used to connect to the internet (web browser) is user-friendly and easy to understand. It's also relatively easy to create.
- **Compatible with other types of media**: The internet provides a high level of engagement with photos and videos, among other media.
- **Affordable**: Internet service development, as well as maintenance costs, are modest.
- **Flexible**: Internet-based communication is highly adaptable. It supports text, audio, and video communication. These services are available at both individual and organizational levels.

How Does the Internet Work?

The internet delivers different types of information and media across networked devices. It operates using an internet protocol (IP) and a transport control protocol (TCP) packet routing network. Whenever you visit a website, your computer or mobile device requests the server using such protocols.

A server is where web pages are stored, and it functions similarly to the hard drive of a computer, except with far greater processing power. The server accesses the web page and delivers the right

information to your computer whenever the request arrives. This is broadly the end-to-end user experience. Let us now look at the more technical details of how the internet works.

1. Connecting computers

The basic foundation of the internet is an interconnected network of computers. When two computers interact, they must be physically (often via an Ethernet connection) or wirelessly connected (via Wi-Fi or Bluetooth). All modern systems can support any of these connections to establish a core network.

2. Scaling computer networks

The computer network, as described above, is not restricted to two PCs. One can link several computers. However, as you expand, it may get more complex. Every machine on a network is connected to a tiny computing device known as a router to address this problem. This router's only function is to operate as a signaler. It ensures that a message transmitted from a particular computer reaches its intended recipient. With the addition of a router, a system of 10 computers needs merely ten wires instead of $10 \times 10 = 100$ connections.

3. Enabling infinite scaling

Let us now discuss interconnecting hundreds of thousands to billions of machines. A single router cannot scale to that extent; nonetheless, a router is an independently programmable computer unit. This implies that two or more routers may be connected, enabling infinite scaling.

4. Utilizing ubiquitous public infrastructure via a modem

By now, we have constructed a network identical to the internet, although it is only intended for individual use and cannot connect with the outside world. This is where public infrastructure comes in. The telephone system links an office to everyone worldwide, making it the ideal wiring configuration for the internet. A modem is necessary for connecting networks to the telephone system. This modem converts data from a network into data that can be managed by the telephony architecture and vice versa.

See More: What Is URL Filtering? Definition, Process, and Best Practices

5. Sending messages from one network to another

The following step is to transmit the information from your network to the target network. To accomplish this, the network must establish a connection with an internet service provider (ISP). An ISP is a service that administers specified routers that are interconnected and also have access

to the routers of other ISPs. Therefore, the data from the host network is delivered to the target network via the web of ISP networks.

To deliver a message to a system, it is important to identify which computer it should be sent to. Therefore, every machine connected to a network has a unique identifying address known as an "IP address" (here, IP refers to internet protocol). It is an address consisting of four integers separated by periods, such as 192.168.2.10. There are several versions of IP; currently, we are in IPv4 and IPv6 iterations, depending on the region.

6. Assigning domain name to IP addresses

IP addresses are intended for computers, but in an infinitely extensible internet, it would be difficult for people to keep count of an ever-growing number of addresses. To simplify matters, one may designate an IP address with a domain name, a human-readable name. Google.com is an excellent example of this — the domain name is used in conjunction with the IP address 142.250.190.78. Therefore, typing the domain name is the simplest way to access a computer online.

7. Connected the internet to the web

The internet is a network architecture that enables millions of machines to communicate with one another. Several of these machines (web servers) can feed web browsers intelligible messages. The web is an application constructed on top of the internet's infrastructure. It is important to note that additional services, like email, have been developed on top of the internet.

8. Connecting the internet to a private intranet or extranet

Intranets are personal and bespoke networks confined to an organization's members. They offer participants a secure gateway to access shared information, collaborate, and communicate.

Extranets are quite similar to intranets, except that they enable collaboration and sharing with other businesses. Typically, they are employed to safely and confidentially transmit information to customers and other enterprise stakeholders. Frequently, their functions resemble those of an intranet: file and information sharing, collaboration tools, message boards, etc.

Intranets and extranets operate on the same infrastructure and adhere to the same protocols as the internet.

Applications of Internet

Introduction

Internet Applications are online tools that rely on the internet to fetch, share, and display information from servers, enabling their successful operation. The internet has helped people to learn many things irrespective of the field. There are n numbers of application of internet in today's world. Let's discuss them in this blog.

Our today's topic is the "application of internet". But before moving to the "application of internet", let's first check what the internet is.

Top Applications of Internet

Here are the top 10 applications of Internet are:

1. Communication
2. Web Browsing
3. Online Shopping
4. Real-Time Update
5. Social Media
6. Job Search
7. Education
8. Travel
9. Stock Market Update
10. Video Conferencing

1. Communication

Communication refers to exchanging ideas and thoughts between or among people to create understanding. The communication process involves the elements of source, encoding, channel, receiver, decoding, and feedback. In organizations, both formal and informal communications simultaneously take place. Formal communications refer to official communications in orders, notes, circulars, agenda, minutes, etc. Apart from formal communications, informal grapevine communications also exist. Informal communications are usually in the form of rumors, whispers, etc. They are unofficial, unrecorded, and spread very fast.

2. Web Browsing

Web Browsing is one of the applications of the internet. A web browser is a program that helps the user to interact with all the data in the WWW (World Wide Web). There are many web browsers present in today's world. Some of them are as follows:

- Google Chrome

- Firefox
- Safari
- Internet Explorer
- Opera
- Microsoft Edge
- Netscape

3. Online Shopping

The era of the internet took shopping into a new market concept, where many virtual shops are available 24x7. The shops provide all the necessary details of a product on their website, so the user can choose as per their needs.

4. Real-Time Update

The internet makes things easier. One can quickly get an update on the things happening in real-time in any part of the world. For example, sports, politics, business, finance, etc. The internet is very useful in many decisions based on real-time updates.

5. Social Media

The youth of this generation spend the maximum of their free time on social media, all thanks to the internet. Social media is a place where the user can communicate with anyone, like friends, family, classmates, etc. User can promote their businesses on social media as well. You can also post your thoughts, pictures and videos with your friends on social media.

6. Job Search

The internet has brought a revolution in the field of Jobs. The candidate can search for their dream job, apply and get it very easily. Even companies nowadays post their need on the internet and hire candidates as per their skills based on the job role.

There are many platforms which are primarily doing this. Some of them are listed below.

- LinkedIn
- Monster.com
- Naukari.com

- Indeed
- Glassdoor
- Upwork

7. Education

The Internet has a vital role in the education field. It became an effective tool in both teaching and learning. Teachers can upload their notes or learning videos on the websites with the help of the internet. It made the learning process more diverse and joyful.

8. Travel

Users can easily search for their favourite tourist places worldwide and plan their trips. One can book holiday trips, cabs, hotels, flight tickets, clubs, etc., with the help of the Internet. Some websites that provide these facilities are as follows:

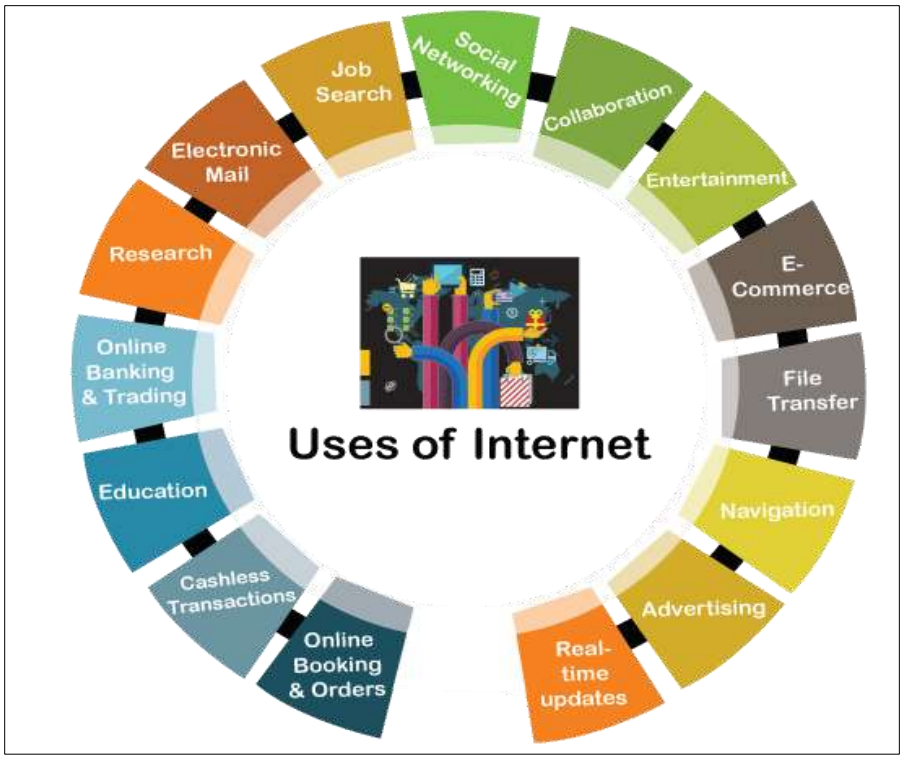
- goibibo.com
- makemytrip.com
- olacabs.com

9. Stock Market Update

A stock market update refers to the latest information and news related to the financial markets, particularly the stock market. The stock market is where individuals buy and sell publicly traded company shares. Stock market updates include vital data and statistics, like the current prices of major stocks, individual stock prices, trading volumes, market capitalization, and price movements.

10. Video Conferencing

Video conferencing means using computers to provide a video link between two or more people. It allows users in different locations to hold face-to-face meetings. You can also see them instead of just talking to someone on the telephone. Video conferencing is a widely accepted mode of communication among businesses, houses, and other organizations.



Security and the Internet

Very huge amount of data is managed across the Internet almost the time, which leads to the risk of data breaching and many other security issues. Both Hackers and Crackers can lead to disrupting the network and can steal important information like Login Credentials, Banking Credentials, etc.

Steps to Protect the Online Privacy

- Install Antivirus or Antimalware.
- Create random and difficult passwords, so that it becomes difficult to guess.
- Use a private browsing window or VPN for using the Internet.
- Try to use HTTPS only for better protection.
- Try to make your Social Media Account Private.
- If you are not using any application, which requires GPS, then you can turn GPS off.
- Do not simply close the tab, first log out from that account, then close the tab.
- Try to avoid accessing public Wifi or hotspots.
- Try to avoid opening or downloading content from unknown sources.

There is an element of the Internet called the Dark Web, which is not accessible from standard browsers. To keep safe our data, we can use Tor and I2P, which helps in keeping our data anonymous that helps in protecting user security, and helps in reducing cybercrime.

Social Impact of the Internet

The social impact of the Internet can be seen in both ways. Some say it has a positive impact as it helps in gaining civic engagement, etc. whereas some say it has a negative impact as it increased the risk of getting fooled by someone over the internet, getting withdrawal from society, etc.

Whatever the impact of Social Media, one thing is that it changed the way of connecting and interacting with others in society. The number of people increasing day by day on social media platforms which helps in constructing new relationships over social media, new communities are made on social media in the interest of the people. Social Media platforms like Facebook, Instagram, LinkedIn, etc are the most used social media platform for both individual and business purposes where we can communicate with them and perform our tasks.

Advantages of the Internet

- **Online Banking and Transaction:** The Internet allows us to transfer money online through the net banking system. Money can be credited or debited from one account to the other.
- **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 the INTERNET.
- **Entertainment:** There are numerous options for entertainment online we can listen to music, play games can watch movies, and web series, and listen to podcasts, YouTube itself is a hub of knowledge as well as entertainment.
- **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 is the medium to help us to do so.
- **Best Communication Medium:** The communication barrier has been removed from the Internet. You can send messages via email, What Sapp, and Facebook. Voice chatting and video conferencing are also available to help you to do important meetings online.

- **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.
- **GPS Tracking and Google maps:** Yet another advantage of the internet is that you are able to find any road in any direction, and areas with less traffic with the help of GPS on your mobile.

Disadvantages of the Internet

- **Time Wastage:** Wasting too much time on the internet surfing 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.
- **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.
- **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.
- **Effects on Children:** Small children are heavily addicted to the Internet watching movies, and games all the time is not good for their overall personality as well as social development.
- **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.

The **World Wide Web** is abbreviated as WWW and is commonly known as the web. The WWW was initiated by CERN (European library for Nuclear Research) in 1989.

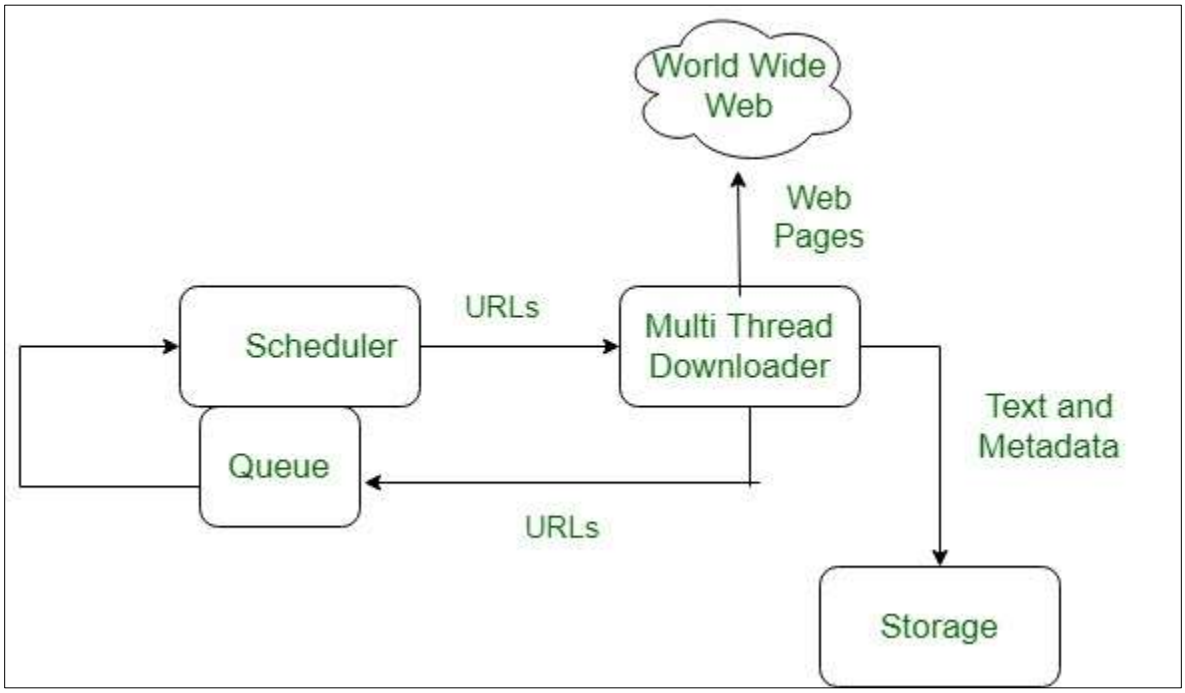
WWW can be defined as the collection of different websites around the world, containing different information shared via local servers(or computers).

History:
It is a project created, by Timothy Berner Lee in 1989, for researchers to work together effectively at CERN. is an organization, named the World Wide Web Consortium (W3C), which was developed for further development of the web. This organization is directed by Tim Berner's Lee, aka the father of the web.

System Architecture:

From the user's point of view, the web consists of a vast, worldwide connection of documents or web pages. Each page may contain links to other pages anywhere in the world. The pages can be retrieved and viewed by using browsers of which internet explorer, Netscape Navigator, Google Chrome, etc are the popular ones. The browser fetches the page requested interprets the text and formatting commands on it, and displays the page, properly formatted, on the screen.

The basic model of how the web works are shown in the figure below. Here the browser is displaying a web page on the client machine. When the user clicks on a line of text that is linked to a page on the abd.com server, the browser follows the hyperlink by sending a message to the abd.com server asking it for the page.



Here the browser displays a web page on the client machine when the user clicks on a line of text that is linked to a page on abd.com, the browser follows the hyperlink by sending a message to the abd.com server asking for the page.

Working of WWW:

The World Wide Web is based on several different technologies: Web browsers, Hypertext Mark-up Language (HTML) and Hypertext Transfer Protocol (HTTP).

A Web browser is used to access web pages. Web browsers can be defined as programs which display text, data, pictures, animation and video on the Internet. Hyperlinked resources on the World Wide Web can be accessed using software interfaces provided by Web browsers. Initially, Web browsers were used only for surfing the Web but now they have become more universal. Web

browsers can be used for several tasks including conducting searches, mailing, transferring files, and much more. Some of the commonly used browsers are Internet Explorer, Opera Mini, and Google Chrome.

Features of WWW:

- Hypertext Information System
- Cross-Platform
- Distributed
- Open Standards and Open Source
- Uses Web Browsers to provide a single interface for many services
- Dynamic, Interactive and Evolving.
- "Web 2.0"

Components of the Web:

There are 3 components of the web:

1. **Uniform Resource Locator (URL):** serves as a system for resources on the web.
2. **Hypertext Transfer Protocol (HTTP):** specifies communication of browser and server.
3. **Hyper Text Mark-up Language (HTML):** defines the structure, organisation and content of a webpage.

What is email?

Electronic mail, commonly shortened to "email," is a communication method that uses electronic devices to deliver messages across computer networks. "Email" refers to both the delivery system and individual messages that are sent and received.

Email has existed in some form since the 1970s, when programmer Ray Tomlinson created a way to transmit messages between computer systems on the Advanced Research Projects Agency Network (ARPANET). Modern forms of email became available for widespread public use with the development of email client software (e.g., Outlook) and web browsers, the latter of which enables users to send and receive messages over the Internet using web-based email clients (e.g. Gmail).

Today, email is one of the most popular methods of digital communication. Its prevalence and security vulnerabilities also make it an appealing vehicle for cyber-attacks like phishing, domain spoofing, and business email compromise (BEC).

How does email work?

Email messages are sent from software programs and web browsers, collectively referred to as email 'clients.' Individual messages are routed through multiple servers before they reach the recipient's email server, similar to the way a traditional letter might travel through several post offices before it reaches its recipient's mailbox.

Once an email message has been sent, it follows several steps to its final destination:

1. The sender's mail server, also called a Mail Transfer Agent (MTA), initiates a Simple Mail Transfer Protocol (SMTP) connection.
2. The SMTP checks the email envelope data — the text that tells the server where to send a message — for the recipient's email address, then uses the Domain Name System (DNS) to translate the domain name into an IP address.
3. The SMTP looks for a mail exchange (MX) server associated with the recipient's domain name. If one exists, the email is forwarded to the recipient's mail server.
4. The email is stored on the recipient's mail server and may be accessed via the Post Office Protocol (POP)* or Internet Message Access Protocol (IMAP). These two protocols function slightly differently: POP downloads the email to the recipient's device and deletes it from the mail server, while IMAP stores the email within the email client, allowing the recipient to access it from any connected device.

To continue the postal system analogy, imagine Alice writes a thank-you note to Bob. She hands the letter to the mail carrier (MTA), who brings it to the post office to be sorted. At the post office, a processing clerk (SMTP) verifies the address written on the envelope. If the address appears to be written correctly and corresponds to a location that can receive mail (MX server), another mail carrier delivers the letter to Bob's mailbox. After picking up the mail, Bob might keep the note in his desk drawer, where he can only access it at that location (POP) or put it in his pocket to read at any location (IMAP).

**The current version of the POP protocol is named POP3.*

What are the parts of an email?

An individual email is made up of three primary components: the SMTP envelope, the header, and the body.

SMTP envelope

The SMTP "envelope" is the data communicated between servers during the email delivery process. It consists of the sender's email address and the recipient's email address. This envelope data tells the mail server where to send the message, just as a mail carrier references the address on an envelope in order to deliver a letter to the correct location. During the email delivery process, this envelope is discarded and replaced every time the email is transferred to a different server.

Header

Like the SMTP envelope, the email header provides critical information about the sender and recipient. Most of the time, the header matches the information provided in the SMTP envelope, but this may not always be the case. For instance, a scammer may disguise the source of a message

by using a legitimate email address in the header of an email. Because the recipient only sees the header and body of an email — not the envelope data — they may not know the message is malicious.

The header may also contain a number of optional fields that allow the recipient to reply to, forward, categorize, archive, or delete the email. Other header fields include the following:

- The **'Date'** field contains the date the email is sent. This is a mandatory header field.
- The **'From'** field contains the email address of the sender. If the email address is associated with a display name that may be shown in this field as well. This is also a mandatory header field.
- The **'To'** field contains the email address of the recipient. If the email address is associated with a display name that may be shown in this field as well.
- The **'Subject'** field contains any contextual information about the message the sender wants to include. It is displayed as a separate line above the body of an email.
- The **'Cc' (carbon copy)** field allows the sender to send a copy of the email to additional recipients. The recipients marked in the 'To' field can see the email address (es) listed in the 'Cc' field.
- The **'Bcc' (blind carbon copy)** field allows the sender to send a copy of the email to additional recipients. The recipients marked in the 'To' field cannot see the email address (es) listed in the 'Bcc' field.

Body

The body of an email contains any information the sender wishes to send: text, images, links, videos, and/or other file attachments, provided that they do not exceed the email client's size restrictions. Alternatively, an email can be sent without any information in the body field.

Depending on the options provided by the email client, the body of an email can be formatted in plain text or HTML. Plain text emails do not contain any special formatting (like non-black font colors) or multimedia (like images). They are compatible with all devices and email clients. HTML emails *do* allow formatting and multimedia within the body field, though some HTML elements may get flagged as spam by email filtering systems or may not display properly on incompatible devices or clients.

What is an email client?

An email client is a software program or web application* that enables users to send, receive, and store emails. Popular email clients include Outlook, Gmail, and Apple Mail.

Software- and web-based email clients each have advantages and disadvantages. Desktop email clients often come with more robust security capabilities, streamline email management across multiple accounts, provide offline access, and allow users to back up emails to their computers. By contrast, web-based clients are usually cheaper and easier to access — since users can log in to their account from any web browser — but are reliant on an Internet connection and can be more susceptible to cyber-attacks.

**Originally, 'email' referred to desktop email clients and 'webmail' referred to web-based email clients. Today, the term 'email' encompasses both systems.*

What is an email address?

An email address is a unique string of characters that identifies an email account, or 'mailbox,' where messages can be sent and received. Email addresses are formatted in three distinct parts: a local-part, a "@" symbol, and a domain.

For example, in the email address **employee@example.com**, "employee" denotes the local-part and "example.com" denotes the domain.

Imagine addressing a letter: the domain signifies the city where the recipient lives, while the local-part specifies the street and house number at which the letter can be received.

Local-part

The local-part tells the server the final location of an email message. It may include a combination of letters, numbers, and certain punctuation marks (like underscores). The maximum number of characters for an email address (including both the local-part and domain) is 320, though the recommended length is capped at 254 characters.

Domain

The domain may be a domain name, like example.com, or an IP address, like 192.0.2.0. In the former case, the SMTP protocol uses DNS to translate a domain name into its IP address before delivering the message to the next server.

Like the local-part, the domain also has to adhere to certain formatting requirements established by the Internet Engineering Task Force (IETF). Approved domain names may include a combination of uppercase and lowercase letters, numbers, and hyphens. An email address can also

be formatted with an IP address in brackets instead of a domain name, although this is rare. The character limit for a domain name is 63.

Is email secure?

Although email is often used to exchange confidential information, it is not a secure system by design. This makes it an attractive target for attackers, who may intercept an unencrypted message, spread malware, or impersonate legitimate organizations. Other email security threats include social engineering, domain spoofing, ransomware, spam, and more.

One of email's most significant vulnerabilities is its lack of built-in encryption, leaving the contents of an email visible to any unauthorized party that might intercept or otherwise gain access to the message.

In an attempt to make email more secure, many email clients offer one of two basic encryption capabilities: Transport Layer Security encryption (or 'TLS encryption') and end-to-end encryption (or 'E2EE'). During TLS encryption, messages are encrypted during transit (from user to server or server to user), and the email service provider retains possession of the private key used to set up this encryption. The email service provider can therefore see the unencrypted contents of the email. During end-to-end encryption (from user to user), messages can only be decrypted by the sender and recipient of the email.

For a complete rundown of email security best practices, see What is email security?

How does Cloudflare help secure email?

Cloud flare Area 1 Email Security is a cloud-based email security solution that helps prevent a number of email threats, including phishing, malware, Business Email Compromise (BEC), and email supply chain attacks. It uses robust machine learning models to identify risks before they reach user inboxes, and integrates with common cloud email providers to enhance existing detection and mitigation capabilities.

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5. Making a small presentation: MS PowerPoint.

A Microsoft PowerPoint presentation, often simply referred to as a PowerPoint presentation, is a digital document or file created using Microsoft PowerPoint software. It is a visual and multimedia means of delivering information, ideas, or messages to an audience. These presentations typically consist of a series of individual slides, each of which can contain various types of content, such as text, images, charts, graphs, audio, and video.

Key characteristics of a Microsoft PowerPoint presentation include:

- **Slides:** A presentation is divided into individual slides, each of which represents a specific point or topic. Users can create, edit, and customize these slides to convey their content effectively.
- **Content:** Slides can contain text, which can be formatted using various fonts, styles, and colors. Additionally, users can insert images, shapes, charts, tables, and multimedia elements, such as audio and video.
- **Templates:** PowerPoint provides built-in templates with predefined layouts, colors, and fonts to give presentations a consistent and professional appearance. Users can choose from these templates or create their own custom designs.
- **Transitions and Animations:** Users can add slide transitions to control how one slide moves to the next. Animation effects can be applied to individual elements within a slide to make the presentation more engaging.
- **Presenter Notes:** Presenters can add speaker notes to each slide, which are not visible to the audience. These notes serve as reminders, explanations, or additional information to guide the presenter during the presentation.
- **Slide Show Mode:** PowerPoint presentations can be delivered in a full-screen mode, enabling the presenter to navigate through the slides one at a time using a keyboard, remote control, or on-screen controls.
- **Printing and Exporting:** Users can print the slides as handouts, notes pages, or as a full presentation. Additionally, presentations can be saved and shared in various file formats, such as PPTX (the native PowerPoint format), PDF, and more.

Microsoft PowerPoint is widely used in various fields, including business, education, and public speaking, to create and deliver visual presentations. It allows presenters to communicate information in a structured, organized, and visually engaging manner. PowerPoint presentations are frequently used for meetings, lectures, seminars, conferences, sales pitches, and other forms of communication where visual aids are beneficial.

STEPS:

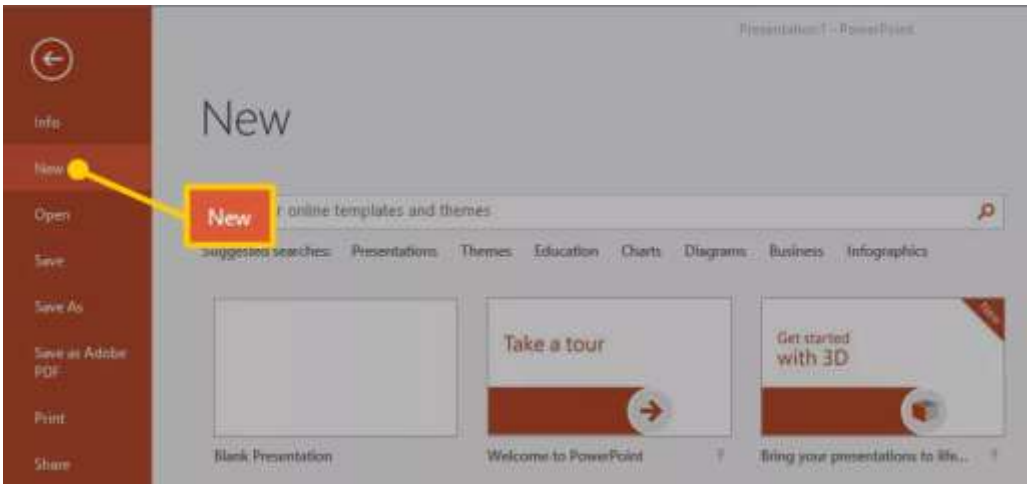
Making presentation in Microsoft PowerPoint is a straightforward process. the step-by-step instructions are given below:

Step 1: Open PowerPoint

Launch Microsoft PowerPoint on your computer. You can typically find it in your computer's applications or programs folder.

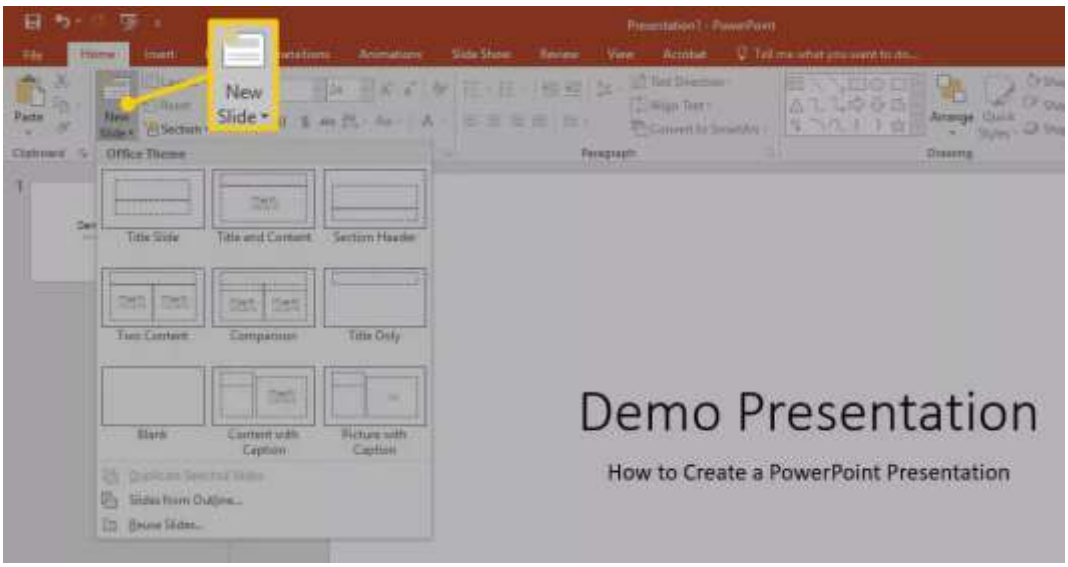
Step 2: Choose a Template

PowerPoint offers a variety of built-in templates to get you started. These templates provide pre-designed slide layouts, color schemes, and fonts. You can choose one or start with a blank presentation.



Step 3: Add Slides

After selecting a template or starting with a blank presentation, you can add slides. To do this, go to the "Home" tab and click on the "New Slide" button in the Slides group. You can select the layout for each slide, such as title, content, picture, or more.



Step 4: Add Content to Slides

Click on the slide where you want to add content (text, images, charts, etc.). You can click in text boxes to add titles and text, and use the Insert tab to add images, shapes, charts, and other elements.

Step 5: Format Your Content

Customize the look and feel of your slides using the Design and Format tabs. You can change fonts, colors, backgrounds, and more.

Step 6: Organize and Reorder Slides

To rearrange or organize your slides, use the "Slides" pane on the left-hand side of the PowerPoint window. Simply drag and drop to reorder them.

Step 7: Add Transitions and Animations

If desired, you can add slide transitions and animations to make your presentation more engaging. Use the Transitions and Animations tabs to do this, but use them sparingly to avoid distractions.

Step 8: Add Speaker Notes

You can add speaker notes to each slide by going to the "View" tab and selecting "Notes Page." This will allow you to add additional information or cues for yourself while presenting.

Step 9: Save Your Presentation

Save your work by clicking the "Save" or "Save As" button. You can save it on your computer, OneDrive, or another location.

Step 10: Present Your PowerPoint

To present your PowerPoint, click on the "Slide Show" tab and choose either "From Beginning" or "From Current Slide." Use the keyboard arrows, a remote clicker, or on-screen navigation to advance through the slides.

Step 11: Print Your Presentation (Optional)

If you need a hard copy, go to the "File" tab and select "Print" to customize your printing options.

Step 12: Share Your Presentation

To share your presentation with others, you can save it as a PDF or PPTX file and send it via email or upload it to a file-sharing platform.

Suggested Readings:

1. Bartee, Thomas C. (1977): Digital Computer Fundamental; McGraw Hill.

2. Chauhan, S.; Chauhan, A. and Gupta, K. (2006): Fundamental of Computer; Firewall Media.

3. Flake, L.J.; McClintock, C.E. and Turner, S. (1989): Fundamental of Computer Education; Wordsworth Pub. Co.

4. Leon, A .and Leon,M.(1999): Introduction to Computer, USB Publishers' Distributors Ltd.

5. Malvino, A.P. and Leach, D.P. (1981): Digital Principles and Appications; TataMcGraw Hill.

6. Mano, Moris M. and Kime, Charles R. (2004): Logic and Computer Design Fundamental; Prentice Hall.

7. Rajaraman, V. (2003): Fundamentals of Computer, Prentice Hall Publisher

8. Sarkar, A. and Gupta, S.K (2002) Elements of computer Science, S Chand and Company, New Delhi.

9. Blissmer (1996): Working with MS Word; Houghton Mifflin Co.

10. Johnson, Steve (2007): Microsoft Power Point 2007; Pearson Paravia Bruno.

11. Leon, A .and Leon,M.(1999): Introduction to Computer, USB Publishers' Distributors Ltd.

12. Leon, A. and Leon, M. (1999): A beginners Guide to Computers, Vikas.

13. Rajaraman, V. (2008): Computer Primer; Prentice Hall of India Pvt. Ltd.

14. Shepard, Aaron (2007): Perfect Pages; Shepard Publications.

15. Tyson, Herbert L. (2007): Microsoft Word 2007 bible; John Wiley.

16. Walkenbach, John (2007): Excel 2007 Bible; John Wiley.

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This self-learning material is based on different books, journals and web sources.