

Subject- 1.2 PRINCIPLES OF MANAGEMENT

OMCA-1ST

UNIT – 1

Introduction & Planning

Management (introduction)

Management means getting things done with the help of people to achieve goals. It involves **planning, organizing, leading, and controlling** activities to make sure everything runs smoothly.

Features of Management:

1. **Goal-Oriented:**
Management always works to achieve specific goals (like profit, growth, customer satisfaction).
2. **Involves People:**
It includes managing people — like employees, teams, and departments.
3. **Continuous Process:**
Management is not a one-time thing. It goes on all the time.
4. **Works at All Levels:**
Management is needed at all levels – top, middle, and lower levels.
5. **Uses Resources:**
Management uses resources like time, money, machines, and people wisely.
6. **Dynamic:**
It changes as the business environment (like market trends, customer needs) changes.
7. **Universal:**
Management is used in all types of organizations – businesses, schools, hospitals, etc.

Objectives of Management:

1. **Achieve Organizational Goals:**
To reach the goals set by the organization (like making profit, growing the company, etc.).
2. **Efficient Use of Resources:**
To use time, money, materials, and people in the best possible way.
3. **Growth and Development:**
To help the business grow and become better over time.
4. **Employee Satisfaction:**
To keep workers happy, motivated, and productive.
5. **Customer Satisfaction:**
To provide good products or services so that customers are happy.
6. **Create a Good Work Environment:**
To make sure there's teamwork, discipline, and coordination.
7. **What are Management Principles?**
8. **Management principles** are basic rules or guidelines that help managers manage work and people effectively. They show how to plan, organize, lead, and control things in a better way.

Principles of Management

No.	Principle	Meaning
1.	Division of Work	Give people specific jobs to do — they get better with practice.
2.	Authority and Responsibility	Managers must have the right to give orders, and they must also take responsibility.
3.	Discipline	Rules and respect must be followed by everyone.
4.	Unity of Command	Each employee should get orders from only one boss.
5.	Unity of Direction	Everyone should work toward the same goal.
6.	Subordination of Individual Interest	Team goals are more important than personal goals.
7.	Remuneration	Employees should be paid fairly for their work.
8.	Centralization	Decision-making should be balanced — not all power to the top, not all to the bottom.
9.	Scalar Chain	There should be a clear chain of command (like a ladder).
10.	Order	Everything and everyone should be in the right place.
11.	Equity	Treat everyone fairly and kindly.
12.	Stability of Personnel	Keep employees for a long time — too much turnover is bad.
13.	Initiative	Let employees take ideas and start things on their own.
14.	Esprit de Corps	Build team spirit and unity in the workplace.

Functions of management are the main tasks that managers perform to run an organization smoothly. These include **planning, organizing, staffing, directing, and controlling**.

Functions of Management:

1. **Planning**
 - Thinking in advance about what needs to be done.
 - Setting goals and making a plan to achieve them.
2. **Organizing**
 - Arranging people, work, and resources properly.
 - Creating a structure of roles and responsibilities.
3. **Staffing**
 - Hiring the right people for the right job.
 - Training and developing employees.
4. **Directing**
 - Guiding and motivating employees.
 - Giving instructions and leadership.
5. **Controlling**
 - Checking if work is going as planned.
 - Finding and fixing mistakes or problems.

Levels of Management

There are **3 main levels of management** in most organizations:

1. Top Level Management

(Examples: CEO, MD, Chairman)

- Makes big decisions for the whole organization.
- Sets goals, policies, and plans.
- Controls and guides all other levels.
- Represents the company to outsiders.

2. Middle Level Management

(Examples: Department Managers, Branch Managers)

- Carries out the plans made by top-level managers.
- Manages and supervises lower-level managers.
- Coordinates between top and lower levels.
- Makes department-level plans.

3. Lower Level Management

(Examples: Supervisors, Team Leaders, Foremen)

- Directly manages workers and staff.
- Gives tasks and instructions to employees.
- Ensures work is done on time and correctly.
- Maintains discipline and motivation at the ground level.

MEANING, FEATURES AND IMPORTANCE OF PLANNING

Planning:

Planning means thinking in advance about **what to do, how to do it, when to do it, and who will do it.**

It is the **first step** in management and helps in setting goals and deciding the best way to achieve them.

Features of Planning

1. **Goal-Oriented:**
Planning is always done to achieve specific objectives.
2. **Primary Function:**
It is the first step in the management process.
3. **Future-Oriented:**
Planning is about making decisions for the future.
4. **Continuous Process:**
It is not done just once; it is needed again and again.
5. **Involves Decision-Making:**
Planning requires choosing the best option among many.
6. **Pervasive:**
Planning is needed at all levels of management.

7. **Flexible:**
Plans may change when situations change.

Importance of Planning

1. **Provides Direction:**
It guides employees on what to do and how to do it.
2. **Reduces Uncertainty:**
Planning prepares the organization for future problems.
3. **Helps in Decision-Making:**
It helps managers choose the best action.
4. **Improves Efficiency:**
Proper planning saves time, money, and resources.
5. **Encourages Innovation:**
It allows managers to think creatively for better results.
6. **Sets Standards for Control:**
Planning gives goals that help in checking actual performance later.

Planning Process (Steps of Planning):

1. **Setting Objectives**
 - Decide what you want to achieve.
 - Example: Increase sales, launch a new product, reduce costs.
2. **Developing Premises**
 - Think about the future conditions (like market trends, competition, resources).
 - These are the assumptions for planning.
 - Example: Prices may rise, or demand may grow.
3. **Identifying Alternatives**
 - Think of different ways to reach your goal.
 - Example: Advertise online or through newspapers.
4. **Evaluating Alternatives**
 - Compare the pros and cons (costs, time, risk) of each option.
 - Find out which option is best.
5. **Choosing the Best Alternative**
 - Select the most suitable and practical plan.
 - This becomes your action plan.
6. **Implementing the Plan**
 - Put the chosen plan into action.
 - Assign tasks to people and start working on the plan.
7. **Follow-Up / Monitoring**
 - Keep checking if the plan is working.
 - Make changes if needed to stay on track.

Types of Planning:

Planning can be divided into different types based on purpose and level. Here are the **main types**:

1. Strategic Planning

- **Done by:** Top-level management (e.g., CEO, directors)
- **Purpose:** Sets long-term goals and direction for the whole organization.

- **Example:** Expanding to a new country in the next 5 years.

2. Tactical (or Functional) Planning

- **Done by:** Middle-level management (e.g., department managers)
- **Purpose:** Turns strategic plans into specific actions for departments.
- **Example:** Marketing department plans a new campaign to support the expansion.

3. Operational Planning

- **Done by:** Lower-level management (e.g., supervisors, team leaders)
- **Purpose:** Focuses on day-to-day tasks and short-term goals.
- **Example:** Creating a daily work schedule for employees.

4. Contingency Planning (*Backup Planning*)

- **Purpose:** Preparing for unexpected events or emergencies.
- **Example:** Having a plan in case the supplier fails to deliver goods.

Effective Planning

Effective planning means making plans that are **clear, realistic, practical, and helpful** in achieving goals. A good plan saves time, uses resources well, and helps everyone know what to do and when.

Features of Effective Planning

1. **Clear Objectives:**
 - The goals should be specific and easy to understand.
2. **Realistic:**
 - The plan should be practical, not imaginary or impossible.
3. **Flexible:**
 - The plan should be able to adjust if situations change.
4. **Time-bound:**
 - It should clearly mention when tasks need to be done.
5. **Based on Facts:**
 - Planning should use correct data and real information, not guesses.
6. **Simple and Easy to Follow:**
 - Everyone should understand the plan easily.
7. **Helps in Decision-Making:**
 - A good plan helps managers make the right choices.
8. **Focus on Results:**
 - The plan should be made to actually achieve the goal, not just look good on paper.

UNIT – II ORGANIZING

Meaning of Organizing:

Organizing means arranging and grouping people, tasks, and resources in a way that helps achieve the goals of an organization. It decides **who will do what, who will report to whom, and how different jobs fit together.**

Features of Organizing

1. **Division of Work:**
Work is divided into smaller tasks for better efficiency.
2. **Departmentalization:**
Similar tasks are grouped together into departments (like sales, finance).
3. **Hierarchy:**
A clear chain of command is created, showing who reports to whom.
4. **Coordination:**
Different departments and people work together smoothly.
5. **Resource Allocation:**
Assigning the right people and resources to the right tasks.
6. **Goal-oriented:**
Organizing always focuses on achieving the organization's objectives.

Importance of Organizing

1. **Helps Achieve Goals:**
Organizing arranges everything so the goals can be met easily.
2. **Clear Authority and Responsibility:**
Everyone knows their job and who they report to.
3. **Better Use of Resources:**
Organizing ensures resources like people, money, and materials are used properly.
4. **Improves Efficiency:**
By dividing work and grouping tasks, work is done faster and better.
5. **Reduces Conflicts:**
Clear roles and responsibilities prevent misunderstandings.
6. **Facilitates Growth:**
Organizing helps the company expand smoothly with clear structure.

Formal Organization

- **Meaning:**
A formal organization is a planned and official structure created by the management to achieve specific goals.
- **Features:**
 - Has clear rules and procedures.
 - Jobs and roles are clearly defined.
 - Communication follows official channels.
 - Authority and responsibility are well established.
- **Example:**
A company's organizational chart showing departments, managers, and employees.

Informal Organization

- **Meaning:**
An informal organization is a network of personal and social relationships that naturally develop among employees at work.
- **Features:**
 - No official rules or structure.
 - Based on friendships, common interests, or social groups.
 - Communication is casual and unofficial.
 - Can influence work behavior positively or negatively.
- **Example:**
Friends chatting during lunch breaks or employees helping each other informally.

Difference

Aspect	Formal Organization	Informal Organization
Structure	Planned and official	Natural and unofficial
Rules	Clear and written	No fixed rules
Communication	Official channels only	Casual and informal
Purpose	Achieve organizational goals	Social and personal relationships
Authority	Clearly defined	No official authority

Organizational Structure

Organizational structure is the way a company arranges people and jobs so everyone knows their roles and who they report to. It shows the relationships between different positions and departments.

1. Functional Structure

Groups people based on their job functions or specialties, like marketing, finance, production, HR, etc.

Example: All marketing staff in one group, all finance staff in another.

Merits (Advantages):

- **Specialization:** People focus on their area of expertise.
- **Efficiency:** Tasks are done quickly because of specialized skills.
- **Easy supervision:** Managers supervise people with similar skills.
- **Clear roles:** Everyone knows their duties.

2. Divisional Structure

The organization is divided based on products, locations, or customer groups. Each division works like a mini-company with its own departments.

Example:One division for electronics, one for clothing, and one for food products.

Merits (Advantages):

- **Focus on product/customer:** Divisions focus on their specific area.
- **Flexibility:** Each division can operate independently.
- **Better control:** Managers handle their own profit and loss.
- **Faster decision-making:** Divisions respond quickly to market changes.

3. Matrix Structure

A combination of functional and divisional structures. Employees report to both a functional manager and a project or product manager.

Example:A software developer reports to the development manager and the project manager.

Merits (Advantages):

- **Efficient use of resources:** Employees can work on multiple projects.
- **Better communication:** Links different departments together.
- **Flexibility:** Easy to adapt to changes.
- **Skill development:** Employees learn from different managers and projects.

4. Line Structure

A simple structure with a direct chain of command from top to bottom. Everyone knows their boss.

Example:Small business or military where orders flow straight down.

Merits (Advantages):

- **Clear authority:** Everyone knows who is in charge.
- **Simple and easy to understand:** No confusion about roles.
- **Fast decision-making:** Quick communication and orders.
- **Discipline:** Clear command helps maintain order.

5. Line and Staff Structure

Combines line structure with specialized staff departments (like HR, legal, IT) who advise and support line managers.

Example:A factory where production managers make decisions, but HR and legal provide support.

Merits (Advantages):

- **Expert advice:** Staff specialists help line managers with decisions.
- **Clear responsibility:** Line managers have authority, staff managers advise.
- **Better support:** Staff departments improve efficiency and planning.

- **Balanced structure:** Combines clear command with expert input.

Summary Table:

Structure	What It Is	Merits (Advantages)
Functional	Grouped by job/function	Specialization, efficiency, easy supervision
Divisional	Grouped by product/location	Focus, flexibility, control, fast decisions
Matrix	Dual reporting (function + project)	Efficient resource use, better communication, flexibility
Line	Straight chain of command	Clear authority, simple, fast decisions

Line and Staff	Line + specialized advisors	Expert advice, clear responsibility, support
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Centralization

In **centralization**, all important decisions are made by top-level managers or a small group of people at the center of the organization.

Advantages of Centralization:

1. **Clear control:** Top managers control everything, so decisions are consistent.
2. **Easy to manage:** Fewer people making decisions means less confusion.
3. **Better coordination:** All departments follow one plan.
4. **Strong leadership:** Experienced managers make decisions.

Disadvantages of Centralization:

1. **Slow decision-making:** Top managers may be busy, causing delays.
2. **Less motivation:** Lower-level employees don't get to make decisions.
3. **Not flexible:** Hard to respond quickly to local problems.
4. **Overburdened managers:** Top managers may get overwhelmed with all decisions.

Decentralization

In **decentralization**, decision-making power is spread out to lower levels of management. Managers at different levels can make their own decisions.

Advantages of Decentralization:

1. **Faster decisions:** Managers closer to the problem decide quickly.
2. **More motivation:** Lower managers feel important and responsible.
3. **Flexibility:** Can respond quickly to local issues.
4. **Reduces burden:** Top managers have less work.

Disadvantages of Decentralization:

1. **Less control:** Top management may lose control over decisions.
2. **Poor coordination:** Different managers may work in different directions.
3. **Risk of mistakes:** Less experienced managers might make wrong decisions.
4. **Higher costs:** More managers making decisions can increase expenses.

Aspect	Centralization	Decentralization
Decision Maker	Top-level managers	Lower and middle managers
Speed	Slower decisions	Faster decisions
Control	Strong control by top management	Less control by top management
Motivation	Low for lower-level employees	High for lower-level employees
Flexibility	Less flexible	More flexible

Meaning of Delegation of Authority:

Delegation of authority means a manager **gives some of their power and responsibility** to a lower-level employee to perform certain tasks or make decisions.

Purpose of Delegation of Authority:

1. **To Share Workload:**
Managers can't do everything alone, so they give tasks to others.
2. **To Improve Efficiency:**
Tasks get done faster when authority is shared.
3. **To Develop Employees:**
It helps employees learn new skills and gain experience.
4. **To Make Quick Decisions:**
Lower-level employees can decide without always waiting for managers.
5. **To Focus on Important Tasks:**
Managers can concentrate on more important work.

Advantages of Delegation of Authority:

1. **Saves Time for Managers:**
Managers have more time for planning and important decisions.
2. **Increases Efficiency:**
Work is done faster and smoothly.

3. **Employee Development:**
Employees get chances to grow and take responsibility.
4. **Better Decision Making:**
People closer to the work can make better decisions.
5. **Motivates Employees:**
Delegation shows trust, which encourages employees to work hard.
6. **Reduces Burden on Managers:**
Managers don't get overloaded with small tasks.

UNIT - III

STAFFING

Staffing is the process of hiring the right people for the right jobs in an organization. It involves finding, selecting, training, and keeping employees who help the company achieve its goals.

Need for Staffing:

1. **Right People for the Job:**
To ensure the organization has skilled and capable employees.
2. **Helps in Growth:**
Good staffing supports business growth and success.
3. **Avoids Labor Shortage:**
Prevents lack of employees during busy times.
4. **Improves Productivity:**
Hiring the right staff increases work efficiency.
5. **Reduces Employee Turnover:**
Proper staffing helps keep employees satisfied and reduces quitting.

Objectives of Staffing:

1. **To Forecast Manpower Needs:**
To predict how many and what kind of employees are required.
2. **To Recruit Suitable Candidates:**
To attract and select the best people.
3. **To Train Employees:**
To improve skills and knowledge of the staff.
4. **To Provide Job Satisfaction:**
To make sure employees are happy and motivated.
5. **To Maintain Qualified and Competent Staff:**
To keep employees who can perform well.
6. **To Ensure Effective Utilization of Human Resources:**
To use employees' talents in the best way.

Characteristics of Staffing

1. **Continuous Process**
Staffing is not a one-time activity. It happens continuously to meet the organization's changing needs.

2. **Goal-Oriented**
Staffing aims to place the right person in the right job to achieve organizational goals.
3. **Involves Human Resource**
Staffing deals with people, their skills, and abilities.
4. **Multistep Process**
Staffing includes many steps like recruitment, selection, training, promotion, etc.
5. **Right Person at Right Job**
Staffing ensures matching employees' abilities with job requirements.
6. **Dynamic Function**
Staffing changes according to internal and external business conditions.
7. **Involves Motivation**
Staffing also focuses on motivating employees to perform better.
8. **Helps in Effective Utilization**
Ensures employees' talents are used efficiently for organizational success.

Staffing Process

Staffing is done in several steps to make sure the right people are hired and placed in the right jobs. The main steps are:

1. **Manpower Planning**
Estimate how many employees and what kind of skills are needed in the future.
2. **Recruitment**
Attract candidates to apply for jobs through ads, referrals, job portals, etc.
3. **Selection**
Choose the best candidates by screening applications, interviews, tests, and background checks.
4. **Placement and Orientation**
Assign selected candidates to suitable jobs and introduce them to the company culture and policies.
5. **Training and Development**
Provide necessary training to improve employees' skills and prepare them for their roles.
6. **Performance Appraisal**
Regularly review employee performance to give feedback and plan for promotions or improvements.
7. **Promotion and Transfer**
Move employees to higher positions or different jobs to use their skills better.
8. **Compensation and Benefits**
Provide fair pay and benefits to motivate employees.
9. **Retention**
Take steps to keep employees happy and reduce turnover.

Recruitment Process

Recruitment is the process of **finding and attracting the right people** to apply for jobs in an organization. It is the first step of staffing.

Steps in the Recruitment Process:

1. **Identifying Job Vacancies**
 - The company finds out how many and what types of employees are needed.
2. **Preparing Job Descriptions**
 - Write down the duties, responsibilities, and required qualifications for the job.
3. **Choosing the Recruitment Method**
 - Decide whether to hire from inside the company (**internal sources**) or outside (**external sources**).

- **Internal:** Promotions, transfers.
 - **External:** Advertisements, job portals, campus recruitment, agencies.
- 4. Advertising the Job**
 - Publish the job opening using newspapers, websites, social media, etc., to attract applicants.
 - 5. Receiving Applications**
 - Collect applications from interested candidates.
 - 6. Shortlisting Candidates**
 - Filter out unqualified applications and select suitable ones for the next stage (selection process).

Selection Process

The selection process helps an organization choose the best candidate from all those who apply for a job. The main steps are:

- 1. Application Form**
 - Candidates fill out a form with their personal and educational details.
- 2. Screening of Applications**
 - Review the applications to shortlist candidates who meet the job requirements.
- 3. Written Test**
 - Conduct tests to check candidates' knowledge and skills related to the job.
- 4. Interview**
 - Talk to candidates to learn more about their experience, skills, and personality.
- 5. Physical or Medical Examination**
 - Check if candidates are physically fit for the job (if needed).
- 6. Reference Check**
 - Contact previous employers or references to verify the candidate's background and work history.
- 7. Final Selection**
 - Choose the best candidate based on all information collected.
- 8. Job Offer**
 - Offer the job to the selected candidate with details about salary, benefits, and joining date.
- 9. Appointment Letter**
 - Give an official letter confirming the job offer and terms of employment.

Essentials of Effective Training

For training to be useful and successful, the following points (essentials) must be followed:

- 1. Clear Objectives**

The purpose of training should be well-defined (e.g., improve skills, increase productivity).
- 2. Needs-Based**

Training should match the actual needs of the employees and the organization.
- 3. Qualified Trainers**

Trainers should be experienced, skilled, and good at communication.
- 4. Right Training Methods**

Choose suitable methods like on-the-job training, workshops, or online courses based on the topic and audience.
- 5. Practical and Relevant Content**

Training should focus on real job situations and tasks.
- 6. Active Participation**

Employees should be encouraged to ask questions, give feedback, and participate actively.

7. Proper Environment

The training environment should be comfortable, with the necessary tools and resources.

8. Regular Feedback and Assessment

Trainers should give feedback and check if learning is taking place.

9. Follow-Up and Evaluation

After training, check if the employee is using the new skills and if the training was effective.

10. Support from Management

Top management should support training by providing time, budget, and motivation.

On-the-Job Training

Training given to employees **while they are doing their actual job** at the workplace.

Examples:

- Coaching
- Job rotation
- Apprenticeship
- Shadowing a senior employee

Merits (Advantages):

1. **Practical experience** – Learn by doing real tasks.
2. **Cost-effective** – No need for extra classrooms or trainers.
3. **Immediate feedback** – Mistakes can be corrected right away.
4. **Builds confidence** – Employees feel more comfortable in their role.

Demerits (Disadvantages):

1. **Work may slow down** – Training may affect regular work.
2. **Lack of proper attention** – Trainers may be too busy.
3. **Risk of mistakes** – Errors during training may affect customers or operations.
4. **Not suitable for all jobs** – High-risk jobs may need outside training.

Off-the-Job Training

Training given **outside the workplace** in a classroom, training center, or online environment.

Examples:

- Lectures
- Seminars
- Role-playing
- Simulation
- E-learning

Merits (Advantages):

1. **Focused learning** – No work pressure or distractions.
2. **Expert trainers** – Training is often conducted by professionals.

3. **New ideas and creativity** – Exposure to different ways of thinking.
4. **Safer for risky jobs** – Best for jobs like pilots, machine operators, etc.

Demerits (Disadvantages):

1. **Costly** – More expensive due to travel, trainers, and materials.
2. **No real job practice** – Learning may not match real work situations.
3. **Time-consuming** – Employees are away from their jobs during training.
4. **Less personal attention** – One trainer may handle many trainees.

Comparison

Feature	On-the-Job Training	Off-the-Job Training
Location	At the workplace	Away from the workplace
Cost	Low	High
Learning Type	Practical and job-specific	Theoretical and general
Risk of Mistakes	Yes	No (simulated environment)
Suitable For	Regular and simple tasks	Complex or risky tasks

UNIT – 1V DIRECTING

Meaning of Directing:

Directing means **guiding, leading, supervising, and motivating** employees to do their work properly and help the organization achieve its goals.

It is one of the main functions of management and happens **after planning, organizing, and staffing**.

Objectives of Directing:

1. **To Give Clear Instructions**
→ So that employees know **what to do, how to do it, and when to do it**.

2. **To Motivate Employees**
→ To keep employees **excited and committed** to their work.
3. **To Maintain Discipline**
→ To ensure employees follow rules and work with **responsibility**.
4. **To Build Teamwork**
→ To promote **cooperation** and help people work together smoothly.
5. **To Supervise Activities**
→ To keep an eye on work progress and make sure it goes as planned.
6. **To Communicate Effectively**
→ To make sure information flows clearly between managers and employees.
7. **To Achieve Organizational Goals**
→ Directing helps align employee efforts with the **overall goals** of the company.

Concept of Leadership:

Leadership is the ability to **influence, guide, and motivate** people to work together toward a common goal. A leader helps the team stay focused, solves problems, and encourages everyone to do their best.

Leadership = Guiding + Inspiring + Directing people.

Importance of Leadership:

1. Provides Direction

A good leader shows the way and keeps the team on track.

2. Motivates Employees

Leaders encourage and inspire employees to give their best effort.

3. Builds Team Spirit

Leadership helps in creating a sense of unity and cooperation.

4. Improves Efficiency

When employees are well-guided and motivated, their performance improves.

5. Handles Conflicts

Leaders help solve problems and manage disputes between team members.

6. Builds Confidence

Leaders boost the confidence of employees by appreciating and supporting them.

7. Facilitates Change

Good leadership helps the organization and employees adjust to change smoothly.

Types of Leaders

There are **three main types of leaders** based on their style of working and decision-making:

1. Autocratic Leader (Authoritarian Leader)

An autocratic leader takes all decisions alone and expects others to follow orders without question.

Features:

- No input from employees
- Strict control
- Quick decision-making

◆ **Suitable When:**Quick action is needed (e.g., emergencies)

◆ **Example:**A factory manager ordering workers to follow instructions strictly.

2. Democratic Leader (Participative Leader)

A democratic leader involves employees in decision-making and values their opinions.

Features:

- Teamwork and discussion
- Encourages feedback
- Builds trust and motivation

Suitable When:Teamwork and creativity are important

Example:

A manager discussing ideas with employees before launching a new product.

3. Laissez-Faire Leader (Free-Rein Leader)

This leader gives complete freedom to employees to make decisions and work in their own way.

Features:

- No interference
- Employees are self-directed
- Useful when staff are skilled and experienced

Suitable When:

Employees are experts and need little supervision

Example:A research team working independently with little direction.

Type of Leader	Decision-Making	Employee Role	Control Level
Autocratic	Only by leader	Follow orders	High
Democratic	Shared with team	Give suggestions	Moderate
Laissez-Faire	By employees mostly	Work independently	Low

Qualities of a Good Leader

A good leader is someone who guides and motivates people effectively. Here are some important qualities:

1. Confidence

- A good leader believes in themselves and their team.
- Confidence inspires others to trust and follow them.

2. Honesty and Integrity

- A leader should be truthful, fair, and ethical.
- People follow leaders they can trust.

3. Good Communication Skills

- A leader must be able to clearly share ideas, instructions, and feedback.
- Also listens to others.

4. Decision-Making Ability

- A good leader makes smart, timely, and fair decisions.

5. Motivational Skills

- Encourages and inspires the team to give their best.

6. Responsibility

- Takes full responsibility for both success and failure.
- Doesn't blame others.

7. Visionary

- Has a clear vision or goal and guides the team toward it.

8. Empathy

- Understands the feelings and needs of team members.

9. Discipline

- Follows rules and expects others to do the same.

10. Adaptability

- Ready to accept changes and handle unexpected situations calmly.

Meaning of Motivation:

Motivation means encouraging and inspiring people to work willingly and do their best to achieve goals.

It is the process of **stimulating a person to take action**. In the workplace, motivation helps employees stay active, focused, and productive.

Motivation = Creating a reason to work better.

Types of Motivation:

1. Intrinsic Motivation (Internal)

- Comes from **inside a person** — like passion, interest, or personal satisfaction.
- Example: A person works hard because they enjoy the job.

2. Extrinsic Motivation (External)

- Comes from **outside rewards or pressure** — like salary, bonus, praise, or fear of punishment.
- Example: A person works hard to earn a promotion or avoid being scolded.

Types of Motivation

There are mainly **two types** of motivation:

1. Intrinsic Motivation (Internal Motivation)

This comes from **inside a person** — like interest, passion, or personal satisfaction.

Example:

- A student studies because they enjoy learning.
- A painter paints for happiness, not money.

You do something because YOU want to do it.

2. Extrinsic Motivation (External Motivation)

This comes from **outside rewards or pressure** — like money, praise, grades, or fear of punishment.

Example:

- An employee works hard to get a bonus.
- A student studies to avoid getting scolded.

Importance of Motivation:

1. **Improves Performance**
– Motivated employees work harder and give better results.
2. **Increases Productivity**
– More work is done in less time when employees are motivated.
3. **Reduces Employee Turnover**
– Motivated staff are more likely to stay with the company.
4. **Builds Team Spirit**
– Motivated teams cooperate better and have fewer conflicts.
5. **Encourages Innovation**
– Motivated employees come up with new ideas and solutions.
6. **Helps Achieve Goals**
– It aligns individual effort with organizational goals.
7. **Boosts Morale**
– Employees feel happy, confident, and satisfied with their job

Meaning of Controlling:

Controlling is a management function that ensures everything is going according to the plan. It means **checking and measuring actual performance**, comparing it with set standards, and correcting any differences to achieve the goals.

Controlling = Checking progress + Making corrections

Importance of Controlling:

1. **Ensures Goal Achievement**
 - Helps make sure the organization meets its targets.
2. **Measures Performance**
 - Shows how well employees and departments are doing.
3. **Identifies Problems Early**
 - Finds issues before they become big problems.
4. **Improves Efficiency**
 - Helps use resources like time and money in the best way.
5. **Maintains Standards**
 - Keeps work quality and behavior up to the mark.
6. **Facilitates Coordination**
 - Ensures all parts of the organization work smoothly together.
7. **Encourages Accountability**
 - Makes people responsible for their work.

Objectives of Controlling

1. **To Achieve Organizational Goals**
 - Make sure the organization's plans and goals are met effectively.
2. **To Ensure Proper Utilization of Resources**
 - Use materials, money, and manpower efficiently without waste.
3. **To Maintain Quality Standards**
 - Keep the quality of products or services consistent and up to standard.
4. **To Identify and Correct Deviations**
 - Detect mistakes or problems early and fix them quickly.
5. **To Improve Efficiency and Productivity**
 - Help employees work better and produce more.
6. **To Facilitate Coordination**
 - Ensure different departments and people work together smoothly.
7. **To Provide Feedback**
 - Give information about performance so future plans can be improved.
8. **To Establish Authority and Responsibility**
 - Clarify roles and make sure everyone is responsible for their tasks.

Traditional Methods of Controlling

Common Traditional Methods:

- **Personal Observation:** Manager personally watches the work process.

- **Statistical Reports:** Use of written reports, records, and charts.
- **Budgetary Control:** Comparing actual expenses with budgeted expenses.
- **Break-Even Analysis:** Analysis to control profit and loss by comparing costs and revenues.

Merits (Advantages):

1. **Simple and Easy to Understand**
Traditional methods are straightforward, so managers and employees find them easy to use and understand.
2. **Low Cost**
These methods don't require expensive tools or technology, so they are affordable for small businesses.
3. **Direct Control**
Personal observation allows managers to directly supervise and guide workers, improving immediate control.
4. **Useful for Small Organizations**
Since operations are less complex, traditional methods work well in small or medium-sized companies.

Demerits (Disadvantages):

1. **Time-Consuming**
Methods like personal observation and manual report analysis require a lot of time and effort.
2. **Limited Accuracy**
Reports may not be updated regularly or may contain errors due to manual handling.
3. **Delayed Information**
Information is often historical, not real-time, which can delay corrective action.
4. **Not Suitable for Large or Complex Organizations**
Traditional methods are less effective when dealing with multiple departments and complicated processes.
5. **Subjective**
Personal observation can be biased and may not always give a true picture of performance.

Modern Methods of Controlling

Common Modern Methods:

- **Management Information Systems (MIS):** Computerized systems providing timely and accurate data.
- **Performance Appraisal:** Systematic evaluation of employee performance against standards.
- **Total Quality Management (TQM):** Focus on continuous quality improvement.
- **Benchmarking:** Comparing business processes against best practices in the industry.
- **Enterprise Resource Planning (ERP):** Integrated software systems managing all business processes.

Merits (Advantages):

1. **Real-Time Data Access**
Modern systems provide up-to-date information, enabling quick and informed decisions.
2. **High Accuracy and Reliability**
Automated data collection and analysis reduce human errors.

3. **Handles Complexity**
Suitable for large organizations with multiple processes and departments.
4. **Encourages Continuous Improvement**
Techniques like TQM and benchmarking help organizations constantly improve their products and services.
5. **Better Resource Management**
ERP and MIS allow efficient allocation and monitoring of resources across departments.

Demerits (Disadvantages):

1. **High Initial Cost**
Setting up modern control systems requires significant investment in hardware, software, and training.
2. **Complexity and Training Needs**
These systems can be complicated to operate and require skilled personnel.
3. **Resistance to Change**
Employees and managers might resist new technology and processes.
4. **Dependence on Technology**
If systems fail or there is a technical issue, it can disrupt operations and control functions.
5. **Security Risks**
Computerized systems are vulnerable to cyber-attacks and data breaches.

Aspect	Traditional Methods	Modern Methods
Cost	Low	High
Speed	Slow (historical data)	Fast (real-time data)
Accuracy	Lower, prone to errors	High, automated and reliable
Complexity Handling	Suitable for simple, small setups	Suitable for large and complex organizations
Training Requirement	Low	High
Risk	Subjective bias, delay in info	System failures, security threats
Flexibility	Less flexible	Highly flexible and integrative

Steps in Controlling Process

1. **Setting Standards**
 - First, set clear and measurable standards (benchmarks) for performance.
 - Standards can be related to quality, quantity, time, cost, etc.
2. **Measuring Actual Performance**
 - Measure or observe the actual work done or results achieved.
 - Use reports, observation, or tools to collect data.
3. **Comparing Actual Performance with Standards**
 - Compare the measured performance against the set standards.

- Identify any differences or deviations.

4. Analyzing Deviations

- Find out why deviations occurred.
- Determine the causes of differences between planned and actual results.

5. Taking Corrective Action

- Take necessary steps to fix problems and bring performance back on track.
- This may involve training, re-planning, or improving processes.

6. Feedback

- Provide feedback to employees and management about performance and improvements.
- Use feedback to improve future planning and control.

Subject- 1.4 Office Management

OMCA- 1st

Unit I: Introduction to Office

1.1 Meaning and Importance of Office

An office is a place where the core administrative and managerial activities of an organization take place. It is considered the control center of the organization, where decisions are made and important tasks are planned. All types of documentation, communication, and record-keeping are managed from the office.

The office plays a vital role in helping the organization function smoothly. It acts as a hub where information is received, processed, and stored. This information is then used by various departments to carry out their daily tasks effectively.

Another reason the office is important is because it helps with supervision and coordination. Managers use office data to monitor staff performance, manage budgets, and maintain quality. With an organized office setup, it becomes easier to plan for the future.

The office also ensures that legal, financial, and operational records are maintained properly. This helps in audits, decision-making, and legal compliance. A well-maintained office leads to better customer service and a more organized working environment.

In short, without an office, an organization would lack direction, structure, and control. It supports the flow of communication, increases productivity, and helps achieve business goals.

1.2 Functions of Office

The primary function of an office is to handle information. This includes collecting information through letters, emails, phone calls, and reports. The office then processes this information to make it useful for decision-making and planning.

Another important function is record-keeping. Offices maintain files, databases, and documents related to employees, customers, accounts, and business operations. These records are stored safely and can be referred to whenever needed.

The office also acts as a communication center. It allows for both internal communication (between departments and employees) and external communication (with customers, suppliers, and clients). This ensures that all operations run smoothly and no confusion arises.

Administrative support is another major role. The office takes care of day-to-day tasks like scheduling meetings, handling calls, printing documents, managing inventory, and supervising clerical staff. This support helps all departments work more efficiently.

Lastly, the office contributes to control and coordination. It provides data for reviewing performance and helps align activities with business objectives. This improves overall efficiency and teamwork within the organization.

1.3 Centralization and Decentralization – Merits and Demerits

Centralization means decision-making is done mainly by top-level management. This helps maintain consistency and control across all departments. It also reduces confusion since instructions come from a single authority. However, it may slow down decision-making and reduce flexibility.

Decentralization, on the other hand, allows lower-level managers to take decisions for their departments. This improves speed and encourages initiative and creativity among employees. It can make the organization more adaptable and responsive to change.

One major advantage of centralization is better coordination and standardization. It reduces duplication of work and ensures uniformity in procedures. But employees may feel less motivated due to lack of authority and slow communication.

Decentralization, while offering independence, may lead to inconsistency and miscommunication between departments. It can also result in unequal distribution of resources if not monitored properly. However, it encourages leadership skills and faster decision-making.

In practice, most organizations use a mix of both systems. They centralize important decisions but decentralize day-to-day operations. The balance depends on the size, structure, and goals of the organization.

1.4 Relation with Other Departments

The office plays a connecting role between different departments like HR, accounts, sales, and production. It ensures that each department receives the information, support, and communication it needs to function properly.

For example, the office helps HR manage employee records, coordinate interviews, and distribute policy updates. For the accounts department, it helps in maintaining financial data, bills, and reports. Similarly, it supports the sales team by preparing quotations and keeping customer records.

Without the office, departments would work in isolation, leading to delays and confusion. The office helps avoid such problems by promoting coordination and information sharing across the organization.

It also ensures that decisions made by top management are communicated clearly to all departments. Any instructions, changes in policy, or targets are distributed through the office. This helps maintain discipline and uniformity.

In conclusion, the office acts like the heart of the organization, pumping necessary resources and information to every department. It builds a strong link between all parts of the business and keeps the organization running smoothly.

Unit II: Office Management,

2.1 Meaning of Office Management

Office management refers to the process of planning, organizing, and supervising all activities that take place in an office. It involves managing both people and processes to ensure smooth and efficient operations. It serves as the backbone of administrative functions in any organization.

The goal of office management is to improve productivity and maintain a disciplined, organized workspace. It includes responsibilities such as scheduling, filing, coordinating communication, and ensuring that office equipment and resources are used effectively.

An efficient office management system helps to create a comfortable and professional environment for employees. It allows teams to work in sync, minimizes confusion, and helps achieve organizational goals more quickly and accurately.

Office management also includes training and guiding staff, handling complaints or issues, and keeping track of day-to-day office operations. It ensures that the workplace runs without unnecessary delays or problems.

In short, office management is the method by which an office stays organized, disciplined, and efficient. It ensures all office-related tasks are done on time and supports the entire organization in functioning properly.

2.2 Importance of Office Management

Office management plays a very important role in the success of an organization. It helps make the best use of available resources—time, money, manpower, and materials. When these resources are managed properly, it leads to improved work output and employee satisfaction.

One of its key benefits is better planning and organization. Office managers maintain records, manage schedules, and ensure that all departments receive the information and support they need. This improves coordination across teams and reduces delays.

Good office management also helps in reducing costs. By avoiding wastage of materials, optimizing time usage, and improving workflow, office management contributes directly to cost control. It ensures every rupee and minute is well spent.

Another benefit is improved communication. Office management ensures that messages are delivered clearly and promptly to the right people. This helps avoid misunderstandings and creates a smooth working relationship among employees and departments.

Finally, it supports decision-making by providing accurate and timely data to top management. When information is well-organized and accessible, decisions can be made quickly and more effectively.

2.3 Qualities of an Office Manager

An office manager must be organized and detail-oriented. They are responsible for keeping the office running smoothly, so they need to manage multiple tasks such as supervising staff, maintaining records, and scheduling work. Good planning helps avoid last-minute confusion and delays.

Communication skills are a must for any office manager. They need to talk with staff, higher management, and clients on a regular basis. Clear speaking, active listening, and writing skills help them communicate efficiently and avoid misunderstandings.

A good office manager is also dependable and trustworthy. Since they handle confidential information and supervise important tasks, they must be honest and responsible. Their decisions can have a big impact on how the office functions.

Problem-solving is another essential skill. Office managers often deal with unexpected issues like system failures, absent staff, or complaints. They must be able to stay calm, think clearly, and take quick actions to solve problems.

Lastly, an office manager should be tech-savvy and open to learning. With many offices depending on software and digital tools, they should be comfortable using computers, managing files, and adapting to new technologies as needed.

UNIT III: Office Accommodation and Layout

3.1 Office Building

The office building is the physical structure where all administrative and managerial activities are carried out. A good office building plays a major role in influencing the efficiency and productivity of employees. The design, structure, and facilities provided in the building should support smooth workflows and employee comfort.

An office building should be located in a place that is easily accessible to employees, clients, and visitors. It should also comply with safety codes, have proper fire exits, elevators, staircases, and be structurally sound. Buildings that are too cramped or outdated may negatively affect the morale and health of the workforce.

The architecture should reflect the values of the organization. For example, modern companies prefer open, well-lit, and collaborative spaces, while more traditional institutions may choose formal layouts. Natural light, proper ventilation, and noise reduction are all important elements in an office building.

The size of the building should align with the number of employees and departments. It should offer enough space for expansion if the organization plans to grow in the future. Moreover, facilities like parking, waiting areas, and lounges add to the convenience of the building.

Lastly, energy efficiency and sustainability are important modern considerations. Many companies now choose eco-friendly buildings with green certifications, as this not only helps the environment but also creates a positive brand image.

3.2 Sections and Sub-sections of Office

An office is usually divided into various sections and sub-sections based on the functions performed. Common sections include accounts, administration, human resources, marketing, IT, and customer service. Each section is responsible for its specific tasks to ensure smooth operations.

Within these sections, sub-sections are often created to manage specialized activities. For example, the HR section may have sub-sections for recruitment, training, and employee welfare. This helps in better task allocation and supervision.

This division of work ensures clarity in responsibilities and avoids duplication of efforts. It also helps in building expertise in particular areas, making each sub-section more efficient and capable of solving specific problems.

Clear sectioning also improves communication within the office. Each department knows who to approach for specific needs, making workflows faster. It also allows managers to assess performance more effectively and assign accountability.

Proper division should also consider privacy, noise levels, and need for collaboration. Some sections like accounting may need more privacy, while marketing might benefit from open discussions. Thus, office design must match the needs of each section and sub-section.

3.3 Office Location

The location of an office is a strategic decision that affects employee convenience, client access, business reputation, and operational costs. A centrally located office near transportation hubs is ideal for most organizations.

A well-located office ensures that employees have easy commuting options like buses, metros, or even cycling routes. It also makes it easier for clients, vendors, and visitors to find and reach the premises.

From a business perspective, offices located in commercial or business districts add credibility and visibility. For customer-facing businesses like consultancies or banks, being in a prominent location builds trust and increases walk-in opportunities.

However, a good location often comes at a higher cost. Companies must balance rental expenses with the benefits of better access and branding. Some businesses, like IT firms, may opt for cheaper outskirts if most of the work is remote or digital.

In modern times, co-working spaces and satellite offices have become popular for companies wanting flexibility. These allow businesses to operate from multiple locations while staying close to clients and reducing commute times for employees.

3.4 Office Furniture and Fixtures

Furniture and fixtures are essential components that influence the comfort, health, and productivity of employees. Proper desks, chairs, storage units, lighting, and other fixtures must be selected carefully.

Ergonomic furniture is key to preventing physical strain. Adjustable chairs, desks at proper height, and footrests help reduce fatigue during long working hours. Poor furniture can lead to back pain, neck strain, and other health issues.

The type of furniture also depends on the nature of work. For example, a designer may need a large desk with drawing space, while a clerk may need filing cabinets and smaller desks. Functionality and comfort should always guide the selection.

Fixtures like lighting, air conditioning vents, and wall partitions must complement the layout. Soft lighting helps reduce eye strain. Fixtures should not obstruct movement or block light and ventilation.

Aesthetic appeal is also important. Well-designed furniture boosts the office's visual appeal and creates a pleasant work atmosphere. Coordinated colors and modern designs reflect professionalism and improve employee morale.

3.5 Office Accommodation

Office accommodation refers to how space is allocated to employees and departments. It involves planning workstations, meeting rooms, lounges, and other areas to ensure proper space utilization and employee comfort.

The accommodation should be done keeping in mind the size of departments and the importance of work privacy. For example, legal or HR departments may need closed cabins, while marketing teams may benefit from open layouts that encourage collaboration.

Proper accommodation also includes support areas like break rooms, pantry, storage spaces, and reception. These add to employee satisfaction and improve visitor experience.

Space planning must also include future needs. If the organization expects to grow, there should be room to add more desks and departments without needing major renovations.

Lastly, circulation space is critical. There should be enough room for people to move around freely without disturbing others. Crowded or poorly planned spaces can lead to stress, confusion, and inefficiency.

3.6 Office Layout – Objectives, Principles, and Private vs. Open Office

Office layout refers to how furniture, workstations, and equipment are arranged within the office. The objective is to create a space that maximizes productivity, ensures employee comfort, and supports effective communication.

Key principles of office layout include efficient space usage, smooth workflow, flexibility, employee comfort, and attractive appearance. A good layout ensures that departments needing frequent interaction are placed close together.

There are mainly two types of layouts: open office and private office. An open office uses fewer walls and promotes a collaborative environment. It is economical and easy to supervise but may cause noise and distractions.

In contrast, a private office layout offers enclosed spaces for individuals or teams. This provides privacy and reduces disturbance but may lead to higher construction costs and less communication among teams.

Modern offices often use a hybrid layout, combining both types. Common workspaces are open, while sensitive departments have private cabins. This flexible approach ensures the best of both worlds and adapts to different work styles

UNIT IV: Office Environment

4.1 Significance of External Surroundings and Internal Environment

The office environment plays a vital role in employee well-being, efficiency, and satisfaction. It includes both internal factors (like lighting, ventilation, and seating) and external factors (like location, traffic, and neighborhood surroundings). A clean, organized, and pleasant environment encourages better concentration and improves morale.

Internal environment factors include the temperature, cleanliness, lighting quality, and noise level inside the office. An overly cold or hot room can distract employees, while poor lighting can lead to eye strain. A calm and noise-free setting is important for focused tasks, especially in roles that require deep thinking or confidentiality.

External surroundings such as the office's proximity to traffic noise, industrial zones, or unpleasant views can also affect employee stress and productivity. Offices located in peaceful areas with green surroundings or nice views can promote calmness and reduce mental fatigue.

A positive office environment reflects the culture of the organization. It promotes discipline, mutual respect, and team spirit among employees. A well-maintained office can also leave a good impression on visitors and clients, showing that the company values quality and professionalism.

In short, an efficient office environment is not just about looks; it deeply affects employee performance and the reputation of the business. Investing in the office environment is investing in long-term productivity and employee happiness.

4.2 Working Facilities – Lighting, Seating, Air-conditioning, Ventilation, Interior Decoration, and Recreational Facilities

Working facilities are the physical resources and arrangements provided to make the workspace comfortable and efficient. Proper lighting is one of the most important factors—it should neither be too bright nor too dim. Natural light is best, but where it is not available, soft white artificial lighting is used.

Seating arrangements must be ergonomic. Adjustable chairs with back support and desks at the correct height prevent physical strain. Poor seating can lead to posture issues and long-term health problems, reducing employee satisfaction and attendance.

Air-conditioning and ventilation are necessary to maintain a pleasant temperature and fresh airflow. Stuffy, hot, or poorly ventilated offices make people feel tired and irritable. Proper ventilation helps reduce the risk of airborne diseases, especially in tightly packed spaces.

Interior decoration adds to the psychological well-being of employees. Pleasant colors, artwork, indoor plants, and thoughtful décor can create a more cheerful and motivating environment. A dull or overly crowded setup can negatively affect the mood and energy levels of employees.

Recreational facilities like break rooms, indoor games, or relaxation corners help reduce stress and encourage team bonding. When employees take short, refreshing breaks, they return to work more energized. Companies that invest in such facilities are seen as caring and modern workplaces.

4.3 Safety and Sanitary Arrangements – Pollution, Noise, and Security Control

Safety and sanitary arrangements are not optional—they are legal and ethical responsibilities of every organization. Safety includes fire exits, smoke detectors, emergency alarms, and first aid facilities. All employees must know the safety procedures and routes in case of emergencies.

Sanitary arrangements include clean restrooms, hand-washing areas, and regular disinfection, especially in shared spaces like cafeterias and meeting rooms. A clean workplace prevents illness and builds employee trust. Many companies also provide sanitary napkin dispensers and hygiene kits in women's washrooms.

Pollution and noise control are crucial in urban office environments. Proper insulation, soundproof walls, and use of noise-absorbing materials can reduce external and internal noise. Air purifiers, plants, and ventilation systems can reduce air pollution and allergens.

Security control involves both physical and digital protection. Offices must have guards, ID card systems, CCTV cameras, and visitor logs. In today's digital age, cybersecurity is equally important—data protection software, firewalls, and access restrictions are used to protect confidential information.

A safe and hygienic workplace enhances employee trust, reduces absenteeism, and ensures compliance with labor laws. It shows that the company values its people and takes proactive steps to provide a secure and healthy work environment.

UNIT V: Organizing an Office

5.1 The Structure of the Organization

The structure of an organization refers to how tasks, responsibilities, authority, and communication are arranged. A well-defined structure ensures that every employee knows their role, whom they

report to, and what work they are expected to do. Without a clear structure, confusion, duplication of work, and inefficiencies can occur.

There are different types of organizational structures. The most common ones are line structure, functional structure, and matrix structure. In a line structure, authority flows directly from top to bottom. In a functional structure, the office is divided based on specialized departments like marketing, finance, and HR. A matrix structure combines both approaches, allowing employees to work under two managers—one for function and one for a project.

A proper structure also ensures a smooth chain of command and proper communication. If the reporting relationships are not clear, there may be delays in decision-making or duplication of efforts. A hierarchical setup ensures accountability and smooth workflow.

The size and nature of the office determine the type of structure it needs. For example, a small office may only need a basic structure, while a large corporation requires a complex structure with multiple levels and departments.

In conclusion, the organization's structure acts like a skeleton that holds everything in place. It provides clarity, increases productivity, and ensures that all parts of the office work together efficiently.

5.2 Process of Organization

The process of organization is a step-by-step approach to creating a working system within the office. It starts with identifying the office's goals, followed by dividing the work into specific tasks. These tasks are then grouped into departments or units according to their nature.

After division, the next step is assigning duties to people based on their skills and experience. This is called delegation. Proper delegation is necessary for balance and efficiency. If a person is overloaded or given the wrong task, the whole system suffers.

Next, a reporting structure is created. This shows who reports to whom, and who is responsible for each task. It helps maintain discipline and keeps the work aligned with the organization's objectives. At this stage, office manuals and guidelines may also be introduced for uniformity in work.

Coordination is also a vital part of the organizing process. It ensures that different departments or employees are working toward a common goal without clashing or overlapping efforts. Regular meetings and communication help in achieving this harmony.

Finally, the organization must be flexible to change. As technology evolves and business goals shift, the process of organizing must be reviewed and adjusted. A good office organization adapts over time to stay efficient and relevant.

5.3 Principles Relating to the Process of Organizing in an Office

There are several key principles that help guide the process of organizing an office effectively. The first is the principle of specialization, which means dividing work based on expertise. When people do tasks they are skilled at, work quality improves and time is saved.

The principle of unity of command states that every employee should report to only one supervisor. This avoids confusion and conflicting instructions. It helps maintain discipline and ensures smooth communication within the office.

The principle of authority and responsibility emphasizes that authority (power to make decisions) and responsibility (duty to complete tasks) should go hand-in-hand. Giving someone responsibility without proper authority can lead to frustration and failure. Both must be clearly defined.

Another principle is span of control, which refers to the number of people one manager can effectively supervise. If the span is too wide, the manager won't be able to guide and monitor all employees properly. Keeping this balanced ensures better management and personal attention.

Finally, the principle of flexibility reminds us that office structures and processes should not be too rigid. A flexible system can adapt to change, adopt new technologies, and shift resources where needed. Flexibility keeps an organization competitive and future-ready.

Subject- 1.5 Fundamentals of IT (Information Technology)

OMCA-1st

A computer can be defined as an electronic machine or device that accepts data and instructions as input, performs processing (calculations and other operations) on the data according to the given instructions and produces the results as output.

Computers can also store data for later uses in appropriate storage devices and retrieve whenever it is necessary.

Charles Babbage designed the difference engine in 1820s and thus is also known as Father of Computer

Generation of Computer

Types of computers are classified into generations depending on their basic characteristics.

A computer belonging to a particular generation shares similar properties with the other computers of that group.

First generation computers (1949 to 1955)

- These were very early stage computers that were designed for mathematical and scientific users.

- Vacuum tubes were the main components in first generation computers.
- The size of these computers was huge and they weighted in tones.
- Machine language was used to provide instructions to these computers and the programming was very difficult.

- They had slow operating speed, consumed a lot of electricity and had small memory.

Examples: ENIAC (Electronic Numerical Integrator and Calculator) UNIVAC (Universal Automatic Computer)

Second generation computers (1956 to 1965)

- The commercial production of computers started.
- Second generation computers used transistors in place of vacuum tubes.
- A transistor is very small as compared to vacuum tube and they consume very less electricity and produce less heat.
- The concept of storage space came and “Magnetic core memories” were developed.
- Operating system and computer programming languages were developed. Examples:

IBM 1401, CDC 3600

Third generation computers (1966 to 1975)

- A new device known as “Integrated circuit” or “Chip” was invented.
- The integrated circuits replaced the transistors in computers.
- Integrated circuit was created by grouping many transistors and other components on a very small silicon chip.
- These computers were smaller in size, more efficient and faster in working and contain huge memories than earlier generation computers.
- They supported high level programming languages.
- These computers were cheaper and now available in offices.

Examples: ICL 1900, Honeywell model

Fourth generation computers (1976 to Present)

- Microprocessors were developed in this generation
- VLSI technology (Very Large Scale Integrated) Circuits were used in computers.
- Thousands of small components were packed on a single chip

- Microprocessor is also called as CPU (Central Processing Unit).
- Magnetic semiconductor memories are mainly used in these computers
- They contain huge storage volumes in the form of magnetic and optical storage.

Examples: STAR 1000, DEC 10

Fifth generation computers (Upcoming)

- “Artificial Intelligence” is the focus area of this generation
- Fifth generation computers would be able to learn from the environment and take decisions.
- These computers will have learning and decision making powers
- These computers will be based on parallel processing using multiple CPUs and will have permanent storage devices.

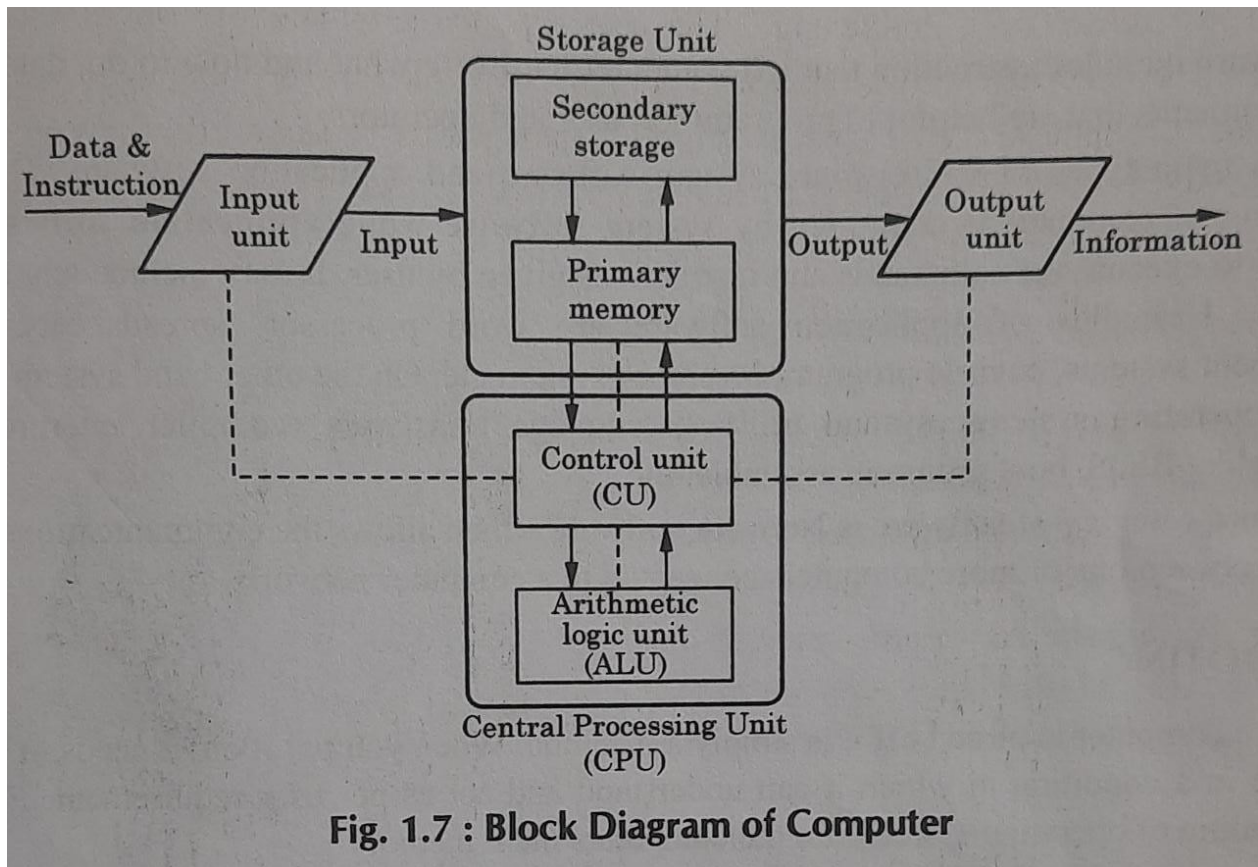
Block Diagram of a Computer

Any computer system has essentially four important parts normally input unit, central processing unit, storage unit and output unit.

Computers perform following five basic operations for converting raw input data into information useful to users.

1. Inputting: The process of entering data and instructions into computer system is called inputting.
2. Storing: Saving data and instructions so that they are available for future use whenever required.
3. Processing: Performing arithmetic operations (like add, subtract, multiply, divide etc.) or logical operations (like less than, greater than etc.) on data in order to convert them into useful information
4. Outputting: The process of obtaining useful information or results to user such as printed report or visual display.

5. Controlling: Detecting the manner and sequence in which all above operations are performed.



In the figure, the solid lines are used to indicate the flow of instruction and data and the dotted lines represent the control exercised by the control unit.

Hardware

The physical components of a computer are collectively known as computer hardware. All the physical parts of a computer that can be touched or seen is called hardware. Examples: CPU, Keyboards, mouse, printer etc.

Computer Hardware can be categorized into two parts

- Internal hardware components
- External hardware components

A. Internal hardware components: These are necessary for the appropriate functioning of the computer. It includes motherboard, CPU, RAM, ROM, Hard disk drive, Solid state drive, Graphic processing unit etc.

B. External hardware components: These are externally attached to the computer to add or improve its functionality. It includes mouse, keyboard, touchpad, camera, printer, scanner etc.

Software

A set of computer programs that is designed to perform well-defined functions. A program is a sequence/ set of instructions which are written to solve a problem.

It is different from hardware but both hardware and software work collectively to perform a task.

Software includes instructions that tell computer hardware what and how to do, data and other set of documents that are helpful to the programmer, user and operators.

Software can be categorized into two types:

- a. System software
- b. Application software

A. System software: System software is a collection of programs designed to operate, control and extend the processing capabilities of the computer itself. System software acts as the intermediary between the hardware and the end users.

Example: Operating system, assemblers, interpreter etc.

B. Application software: It is designed to cater a particular need of a particular environment. It directs computer to execute the commands and given by user. Example: word processor, spreadsheets, any web application etc.

Booting

Booting is the process of starting a computer.

Booting can be performed either by hardware action, such as pressing a button or by a software command. When you put the computer on, it needs to bring the hardware in a condition in which it can understand and act as per user requirement. For this it needs loading of operating system into the computer main memory.

This process of starting the computer and loading the operating system like Windows, Linux etc. into its main memory is called Booting.

There are two types of Booting

- a. Cold booting
- b. Hot booting

- A. **Cold booting:** In cold booting, the computer is started or powered ON from shut-down state. During cold-booting, all the instructions are read by the system from the ROM (BIOS) and the operating system will be automatically loaded into the system.

This booting is also called as Hard booting

This booting is more time consuming than Hot booting

- B. **Hot booting:** The hot boot is the process of restarting the computer without switching off the power supply. In this boot, the computer does not start from the initial state.

This boot is required in cases when system is struck off somewhere (hang state) and most commonly Ctrl+Alt+Del buttons are used to reboot the system.

This is also called as warm boot or soft boot.

Steps of Boot process: There are 6 steps

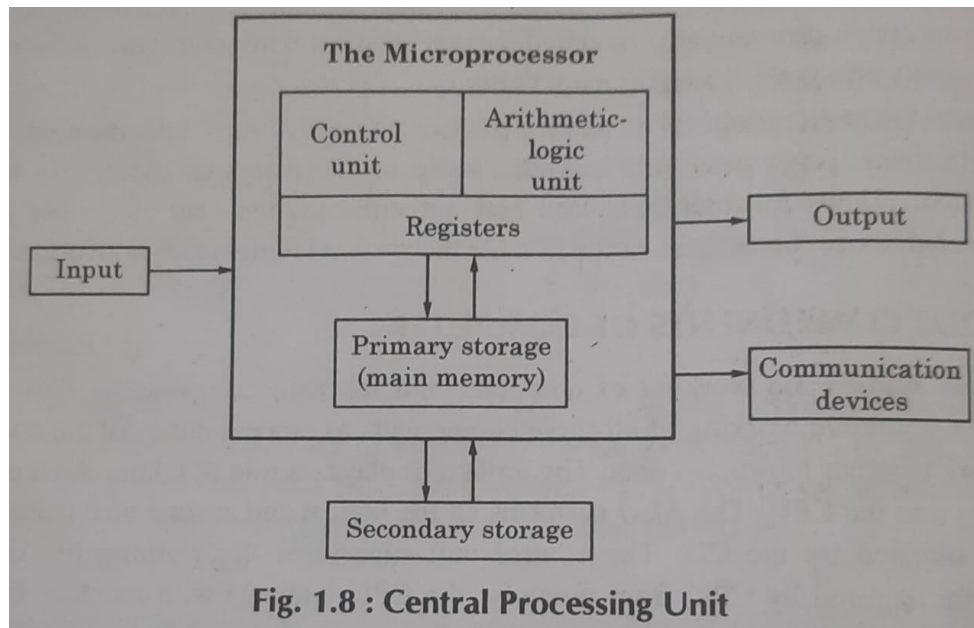
- a. **The startup:** The switching of power of computer ON is called startup. This step supplies electricity to BIOS program in ROM and to the processor of computer

- b. **POST:** POST means Power On Self Test. This program is stored on ROM and as soon as the power is switched on, the program starts initial check of input and output devices connected to computer, RAM and presence of disk drivers. If any necessary hardware is found missing, a beep sound is produced to report the error and system hangs over there.
- c. **Loading of operating system:** Once POST is performed properly and no error occurs then the bootstrap loader program starts loading the operating system into the main memory. When the entire operating system gets loaded into RAM, the initial files are executed and it is ready to work.
- d. **System configuration:** Now in this step, different drivers are loaded into the main memory. Drivers are the special system programs which are necessary for functioning of various peripheral devices connected to computer. This is called configuring the system
- e. **Loading system utilities:** The basic functioning programs like antivirus program, data compression program etc. are called system utilities. After configuring the system, these system utilities are loaded in main memory.
- f. **User authentication:** The last step of boot process is user authentication. This step is performed if any password has been setup on the computer system. In this step, the system allows to enter password and authenticates the user if correct password is entered. Once the authentication is done the system is fully ready to work on.

Central Processing Unit (Functional Parts and Functions)

CPU is responsible for actual processing of inputs to generate the output. CPU is considered as the brain of computer and is also called as Microprocessor.

The speed and efficiency of computer mainly depends upon the CPU.



CPU is divided into Arithmetic Logic Unit (ALU) and Control Unit (CU) ALU performs Arithmetic and Logical calculations

CU supervises the working of ALU

- a. **Control Unit:** CU supervises the working of ALU. CU decides the sequence of programs to be executed. It also coordinates the functioning of various input output devices attached to computer.
- b. **Arithmetic Logic Unit:** ALU is part of CPU where actual calculations and logical comparisons are performed. The arithmetic calculations involve addition, subtraction, greater than, less than etc. These calculations are performed on data that is stored in internal storage areas of CPU, called registers.
- c. **Registers:** Registers are internal storage locations inside the CPU that are used to store instructions or data. These registers are used by ALU and CU for storing intermediate results and control information.

Types of Registers are

- The **Program Counter** is used to keep the address of the next instruction to be fetched.

- The **Instruction Register** is used to store the address of the current instruction that is being processed
- The **Address Registers** are used by instructions for indirectly accessing the contents of memory by its address.

Memory

Memory is responsible for storing the data and instructions either temporarily or permanently.

Memory is the storage area where all the inputs are stored before processing and the outputs are stored after processing of inputs.

Memory also serves as the space to store the instructions.

Functions of memory

Stores the data and instructions to be processed Stores

intermediate result for processing

Stores the final results of processing before these are released to an output device.

Primary and Secondary Memory

Primary memory: Primary memory is the main memory that the CPU has access to. This is also known as volatile memory. The storage capacity of these memories is far less than secondary storage devices. Primary memory is used when you start the computer and when using some application file that has not been saved in the secondary storage.

RAM and cache memory are examples of it.

RAM (Random Access Memory) is a type of primary memory. It is used by all the programs running on the computer. It is a read write memory which means you can read the information stored in this memory as well as write new information into this memory.

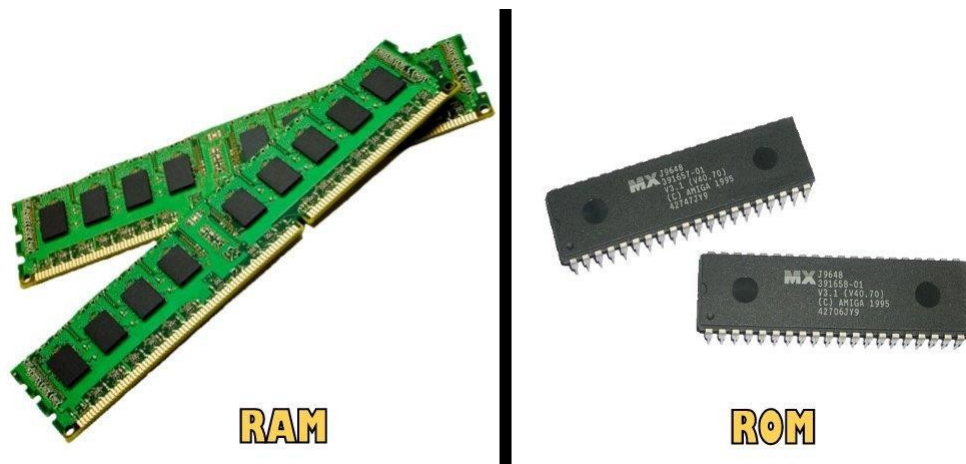
ROM (Read-only memory) is the other type of primary memory. ROM is used to store instructions that are important for starting up a computer. ROM contains several programs that run automatically when you start a computer.

ROM is a permanent memory and its contents are retained when you switch off the computer.

Modern computers contain utility programs to edit and store the data stored in ROM chips.

Some types of ROM are

- a. PROM (Programmable Read Only Memory)
- b. EPROM (Erasable Programmable Read Only Memory)
- c. EEPROM (Electrically Erasable Programmable Read Only Memory)



Secondary Memory:

The secondary memory devices are used to permanently store the information generated from computer. Secondary memory is a non-volatile memory that is external to the computer. It is the type of memory that is available to the user in the form of various devices and media.

Examples: Hard disk, CDs, DVDs, USB storage devices

Advantages of secondary memory:

- a. Permanent storage where data is not lost when we switch off the computer.
- b. Huge storage capacity (Several GBs or TBs)
- c. Low storage cost of data

- d. Data transfer between two or more storage computers

Volatile and Non-volatile memory

Volatile memory is a type of computer memory that requires power to maintain its data. When the power supply is turned off, the data stored in volatile memory is lost. It is typically used for temporary storage of data that needs to be accessed quickly.

It is fast but it has limited capacity and is more expensive than non-volatile memory. Example of volatile memory includes the cache, RAM of the computer.

Non-volatile memory

It can retain the data even when the power supply is turned off. Non-volatile memory is used for long-term storage of data that needs to be accessed even after the computer has been turned off.

It is slower than volatile memory but has a much larger capacity and is less expensive.

Example of Non-volatile memory includes optical storage discs, secondary storage like ROM, flash memory, hard drives or solid-state drives.

Units of Memory

- a. **1 bit:** A bit is a value of either a 0 or 1. It is the space required to store one binary digit (0 or 1) in the memory.
- b. **1 Nibble:** 1 nibble is equal to 4 bit
- c. **1 Byte:** It consists of 8 bits. It is the space required to store 1 character of keyboard (like letter “A” or “B”)
- d. **1 KiloByte (KB):** The space required to store 1024 Bytes in the memory. 1 KB = 1024 Bytes

- e. 1 MegaByte (MB): The space required to store 1024 KiloBytes in the memory.
1 MB = 1024 KB
- f. 1 GigaByte (GB): The space required to store 1024 MegaBytes in the memory.
1 GB = 1024 MB
- g. 1 TerraByte (TB): The space required to store 1024 GigaBytes in the memory. 1 TB = 1024 GB
- h. 1 PetaByte (PB): The space required to store 1024 TerraBytes in the memory. 1 PB = 1024 TB

Some abbreviations:

- CPU: Central Processing Unit
- RAM: Random Access Memory
- ROM: Read-only Memory
- BIOS: Basic Input/Output System
- GPU: Graphics Processing Unit
- ALU: Arithmetic Logic Unit
- USB: Universal Serial Bus
- HDD: Hard Disk Drive
- SSD: Solid State Drive

Storage Devices

Computer storage devices are used to store huge amounts of data and information permanently.

Different types of storage devices are

1. **Magnetic storage devices:** They use magnetized material to save the data. When the device gets connected to a computer, a powerful magnetic field is

formed and the machine can read and store binary information using the two magnetic polarities.

Examples: Hard drive, Floppy disk, Zip-disk etc.



hard disks



floppy disks



zip disks

2. Optical storage devices: Lasers and lights are utilized to detect and store information in these devices. They are cheaper than USB drives and can store more data.

Example: CD-ROM, DVD, Blu-ray disc etc.



Compact Disc (CD)
Capacity: 700 MB
Available from 1982



DVD
Capacity: 4.7 GB
Available from 1995



Blu-ray Disc
Capacity: 25 GB
Available from 2006

- 3. Flash Memory Devices:** These devices display both magnetic disks and storage technologies. They are simple to use, transportable and readily available. They are more cost effective and convenient method of data storage.

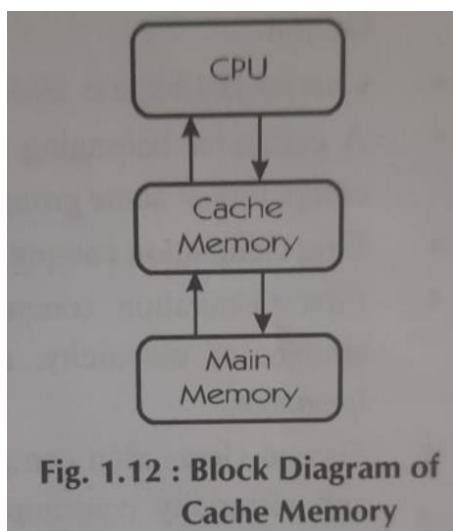
Examples: USB drive (pen drive), memory card



Cache Memory: Cache memory is a very high speed memory which is placed between the processor and main memory to adjust the difference of their working speed. Its objective is maximizing CPU utilization.

The frequently accessed data and instructions are stored in cache memory so that they are immediately available to the CPU when needed.

Cache memory is used to reduce the average time to access data from the main memory.



Various types of cache memory are

Level 1 or L1 cache (Present inside the CPU)

L2 cache (It is present on board, maybe inside or outside the CPU) L3 cache
(Located outside the CPU but in close proximity)

CPU speed and CPU word length

CPU performance is dependent on two main factors

- a. Clock speed
- b. Word length

CPU clock speed or clock rate tells how fast a CPU can work.

Or how many instructions cycles the CPU can deal with in a second. It is measured in Hertz.

The faster the clock speed, the faster would be the processing of data by the computer.

Word length corresponds to maximum number of bits of information that a computer can process at one time.

It is expressed in terms of bits.

The larger the word length is, the faster the computer.

Basic Internet Skills

Data communication means sending data electronically from one computer to another. It involves linking of computers, which allows the resources of one computer to be shared by the other.

Computer network is a group of computers and peripheral devices connected through a data communication system. A computer network facilitates the sharing of hardware and software resources among different users working on different computers.

The aim of networking is to share resources.

Hardware sharing: All the devices like printer, scanner etc. are attached to a remote server which is shared among multiple computers.

Software sharing: Every application software can be installed on main server rather than installing it on every computer individually.

Efficiency of hardware and software resources: As all the resources are installed at a single point so all the modifications can be done at that single point.

Reduces Data redundancy: The data that is used by multiple people can be stored at single point and shared through common network. This reduces data redundancy.

Saves Paper and time: Files can be shared digitally.

Internet sharing: Common network gives access to internet to all the systems.

Security: As all the data is there on the server so securing that server is enough to secure the data.

Browser

Web browser is a software that interprets the markup of files in HTML, formats them into web pages and displays them to the user.

It is a software program on your computer which is used to access information from World Wide Web servers.

The largest networked collection of linked documents is known as World Wide Web. In web browser

1. A window displaying the current page
2. Web links which changes colors when used (Initially they are in blue color and after using they turn purple)

3. A row of button at the top of browser window which are home button, back and forward buttons, stop button. There are also The Go menu and Preferences and the Bookmarks.

URL (Uniform Resource Locator)

Each web page or internet can be accessed by using a unique address, this unique address is called URL.

Web browser uses a URL to identify the location of a web page. Example:

<http://www.kuk.edu/lib/btech.html>

Structure of URL

URL contains three parts.

First part http specifies the protocol. HTTP will be used to transfer the content of web page.

Second part www.kuk.edu specifies the address of site. (In this, edu specifies that this is education site, www specifies that this site is on world wide web, kuk is name of the organization which hosted the website)

Third part /lib/btech.html specifies the path of file btech.html which is stored in the folder lib.

Different Protocols for URLs :

Protocol	Types of access
http : //	HTML documents
telnet :	Remote Telnet (login) session
File :// HTML	documents on your hard drive
news ://	Use net news group on a particular news server
https ://	Some "secure" HTML documents
ftp ://	FTP sites and files

Different Types of URLs :

- Absolute URL
- Relative URL

Absolute URL : The absolute URL uses a complete internet address to specify the location of the web page. It specifies the transfer protocol, then the particular server on which the file is located and finally the actual path of the file on server. For example :

`http : // www. microsoft. com/windows/index.html`

Relative URL : Relative URL is used for accessing a file on web when the full internet address is unnecessary. In most cases websites uses hyperlinks which points to documents and other files located on the same site and often in the same folder. When relative URL is used the base part of URL is automatically concatenated to the relative URL by the web browser.

World Wide Web (WWW)

WWW is a network of millions of servers, hosts and users. The contents stored on web are accessed through web browsers.

WWW is also a tool to find and retrieve information using links to other web pages.

Hypertext: Hypertext is similar to normal text but it is linked to another text or page or information content.

Hypermedia is advanced version of hypertext document as it contains sound, image or video apart from text.

Three key components of www are

- a. URL (Uniform Resource Locator)
- b. HTTP (Hyper Text Transfer Protocol)
- c. HTML (Hyper Text Markup Language)

HTTP defines how information is transferred between the server and the browser. All HTML files are transferred using HTTP protocol. The HTTP protocol is a TCP/IP (Transmission Control Protocol / Internet Protocol) based protocol.

HTML is used for creating web pages. WWW is a collection of millions of online documents which are written in HTML and they provide a link from one document to other. HTML is based on a set of predefined tags. Using these tags, we can alter the text like underline it, bold or italic it etc.

Efficient use of search engines

A search engine is a collection of program that gathers information from the web, indexes it and puts it in a database so that it can be searched. Search engine uses just keywords or phrases to search the result.

Search engine contains a computer program called 'spider' or 'crawler' or 'bot' or 'robot' which is responsible for building up the database attached with each search engine.

Various search engines are:

1. Alta Vista (<http://www.altavista.com>)
 2. Excite (<http://www.excite.com/>)
 3. Goggle (<http://www.google.com>)
 4. Hot BOT (<http://www.hotbot.com>)
 5. Info seek (<http://www.infoseek.com/>)
 6. Khoj ([http://www.khoj/](http://www.khoj.com). com)
 7. Lycos (<http://www.lycos.com/>)
 8. Megellan ([http://wwwmckinley.com/](http://www.mckinley.com/))
 9. Northern Light ([http://www.norhternlight.com/](http://www.northernlight.com/))
 10. Rediff ([http://www.rediff/](http://www.rediff.com). com)
 11. Web crawler (<http://webcrawler.com> <SEARCH.doc>)
 12. Yahoo! (<http://www.yahoo.com/>)
- They all share more similarities than differences.

Starting a search engine

Step 1: Enter the URL of a search engine like www.google.com and then press enter key.

Step 2: Type what you want to search in the search box

Step 3: Clicking the search button, a large number of hyperlinks are retrieved in accordance to their relevance to the search topic.

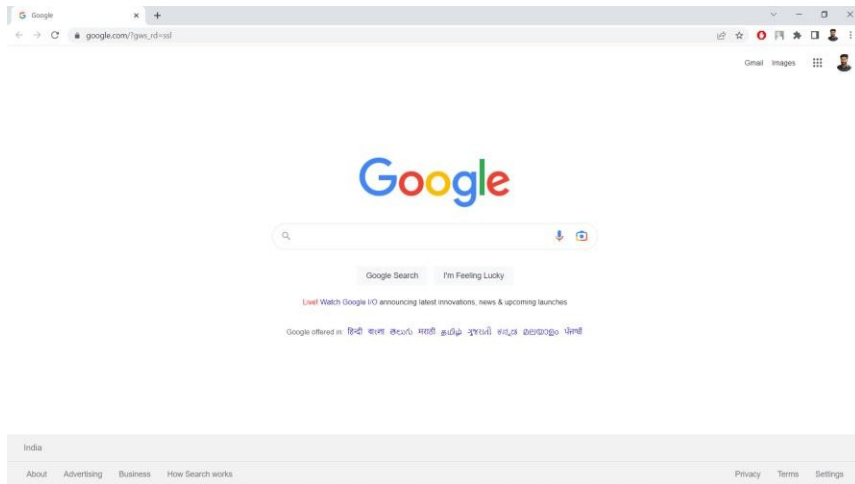


Figure 1 Shows the Step 1

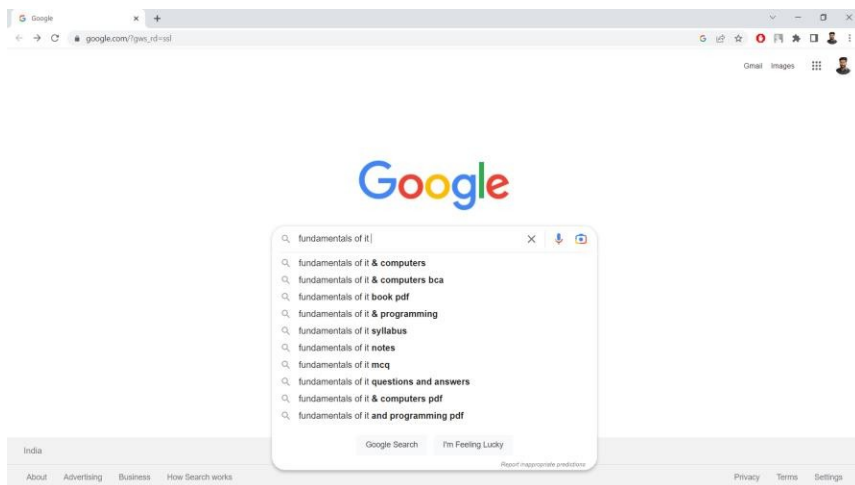


Figure 2 Shows the Step 2

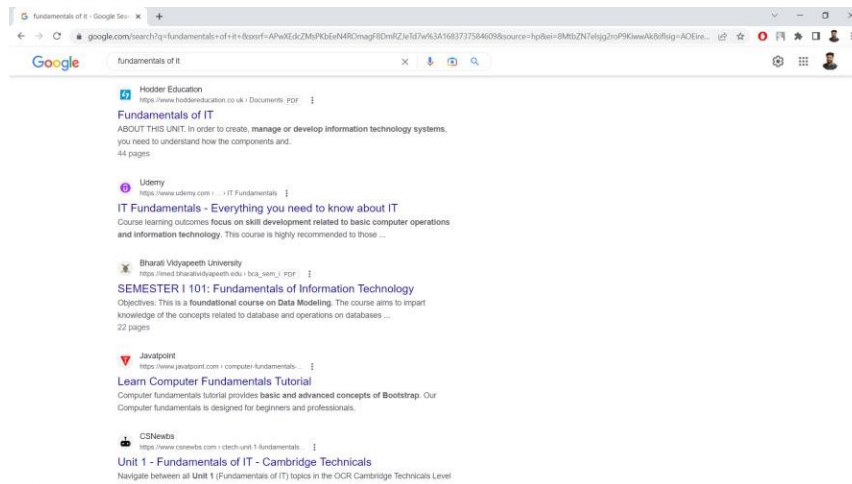


Figure 3 Shows the Step 3

About GOOGLE search engine

- Google is a user friendly search engine.
- It is not case sensitive
- It does not use wild card characters
- It supports logical operations 'OR'
- It can restrict the search to specific extensions
- Implied operators +, -, & are used to indicate the existence of a word or its absence.

Digital India

This program was launched by Prime Minister of India, Sh. Narendra Modi on July 1, 2015.

The program ensures that govt. services are made available to citizens in electronic forms. It is done by improving online infrastructure and increasing internet connectivity.

The important initiatives under Digital India campaign are

- Digilocker
- E-education
- E-health
- E-kranti

- E-hospitals
- BHIM-UPI portal

Digital India portal has been launched by Government of India to comprise all the services on a single portal. It started in 2017. Department of Electronics and Information Technology (DIET) is running this project with state and central government.

Objectives of Digital India portal are

- Provides e-payment system
- Provides delivery services
- Provides PAN, AADHAAR related services
- Bill payment, shopping, certificates, passport, driving licence etc.

National portal of India provides a single window access to information and services that are electronically delivered from all the government departments. It presents information resources and online services from government sources accessible from a single point.

Example: NSP (National Scholarship Portal)

State portals are developed for each state separately to provide access to information and services available for separate state.

Example: Haryana state has CM Window, E-mausam Krishi service etc.

E-mail (Electronic Mail)

Electronic mail is popularly known as E-mail and its purpose is to send the electronic formatted message.

Email provides the ability to distribute information to large number of people virtually, instantaneously and inexpensively.

2.5.1 E-Mail Address

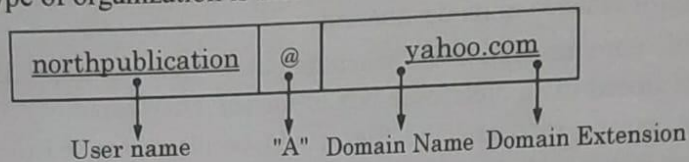
To send and receive mails, one needs to have an e-mail address. The E-mail address works similar as our postal address or phone number. While sending an e-mail, we enter the E-mail address (s) of the recipient(s) so that the computer knows where to send it.

An e-mail address consists of two parts, separated by the @ ('at') symbol. An e-mail address does not contain spaces.

E.g., northpublication@yahoo.com

User Name : It is the name of a person's account, which can be an actual name of any name.

Domain Name : It is the location of the person's account on the Internet separated by a period (.) and then type of organization is mentioned.



There are many sites on the Internet which provide free e-mail facility. The popular sites are www.hotmail.com, www.yahoo.com, www.gmail.com, www.rediffmail.com.

2.5.2 Advantages of E-mail

- The cost of sending an electronic message is nominal.
- The messages are sent and received instantly.
- E-mails never get lost and do not reach at the wrong destination.
- E-mail allows us to be in touch with the people who are staying far away.
- We can attach pictures, videos, sounds to our e-mails and send it to anyone.
- We can read, print, forward, reply or delete the received message.

Log-in

Google
Sign in
to continue to Gmail

Email or phone

[Forgot email?](#)

Not your computer? Use Guest mode to sign in privately.
[Learn more](#)

[Create account](#) [Next](#)

Google
Hi Saurav

sauravkumar0816@gmail.com

Enter your password

☐ Show password

[Forgot password?](#) [Next](#)

E-mail service providers in India

Top free providers include Gmail, Yahoo, Outlook, AOL, Zoho, Mail.Com, and ProtonMail. Some other Email providers are CounterMail, Hushmail, and Tutanota.

Effective use of Gmail

1. Use labels to categorize the emails
2. Install Gmail add-ons like Docu sign, Grammarly, Gphy etc.
3. Use Gmail shortcuts for various steps
4. Keyboard based search operators to work faster

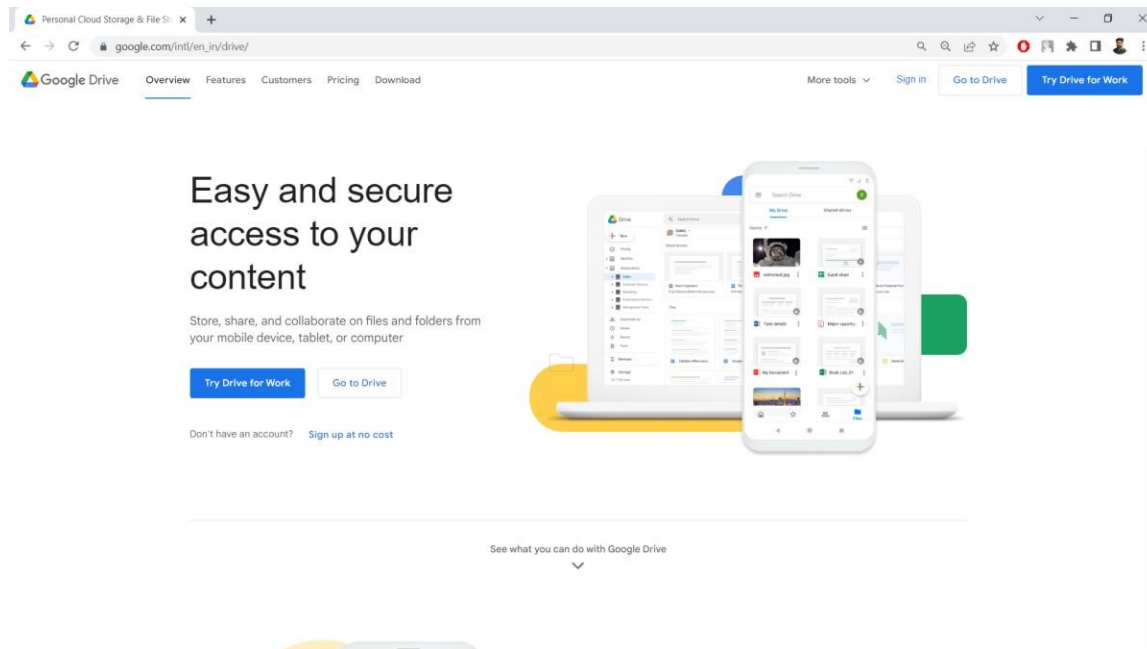
S. No.	Search operator	Function
1.	from :	specify sender
2.	to :	specify recipient
3.	older :	search manages older then specified time period
4.	newer:	search message that are newer than specified time period
4.	subject:	words in subject line

5. Clean Gmail inbox regularly to use it effectively. Can also use Autoclean feature of Gmail.
6. Unsubscribe email on Gmail which you no longer need.

Effective use of Google Drive

Google drive or G drive allows to store documents, images, videos etc. remotely to the cloud and they can be accessed from anywhere.

Initial drive storage of 15 GB is free and can be accessed from any device.



1. Find the needed file using search after opening google drive
2. Publish the file to web for making the sharing of file publically in simple ways.
3. Pull out text from images while saving them
4. Shorten long links using URL shortener add-on
5. Back-up and sync the files from laptop or phone
6. Use color code in the files to find them fast
7. Use keyboard shortcuts to save time and clicks.

Google Calendar

Google calendar is a time management and scheduling service.

It allows user to edit and create events and comes free with google account. It can be used on laptop and mobile phones

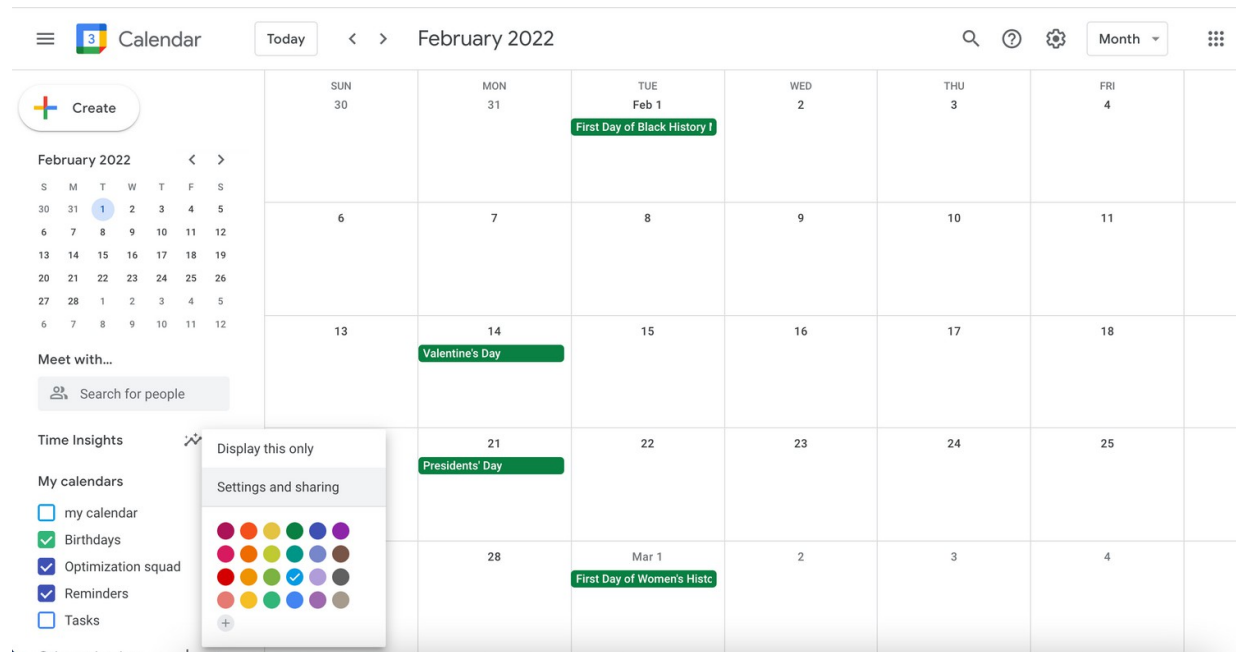
On this, we can quickly schedule meetings and events and can get reminders about them

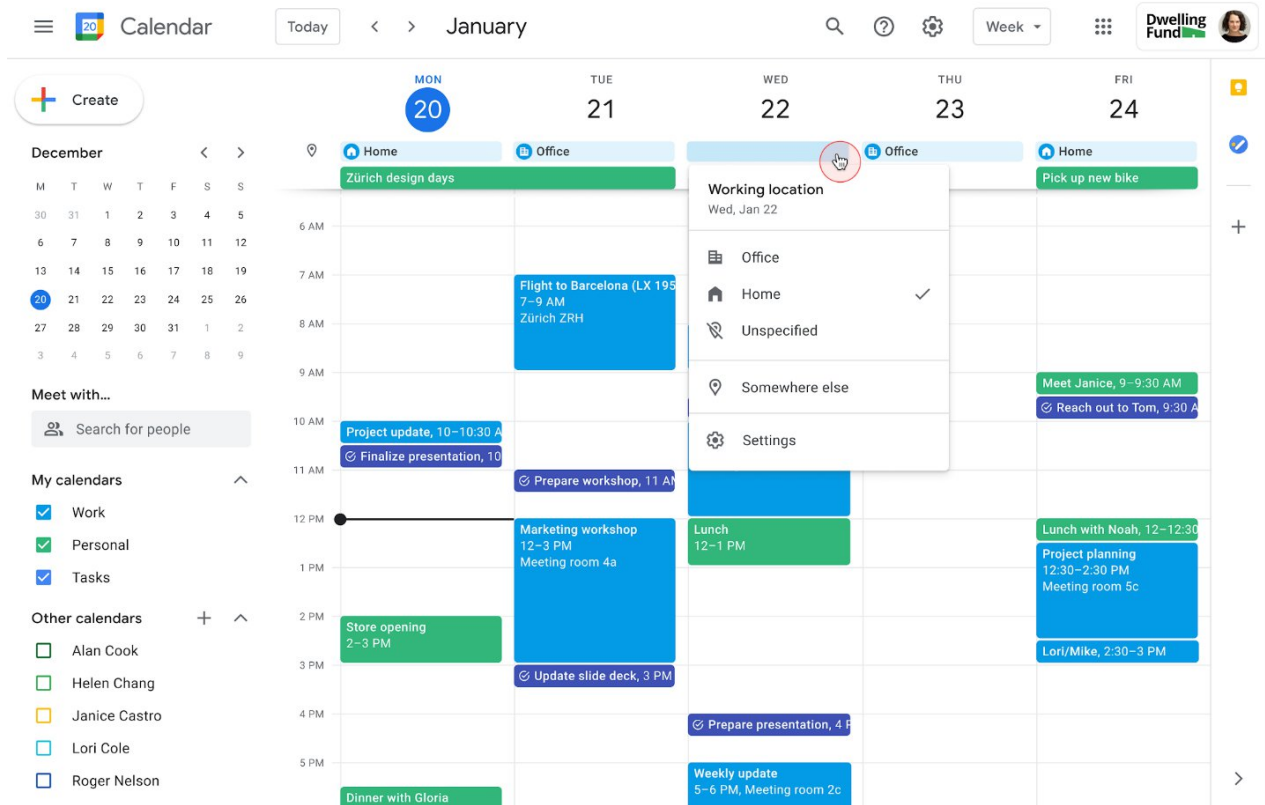
We can share our schedule with others also and they can make changes as well

It has a set start time and stop time option along with option for all day event. Recurring functions can also be used for frequency.

Colors can be used to highlight the events.

Locations can be added, notifications can be sent and events can be seen on other phones also.





Google Sites

Google sites is a free website builder from google. It allows to create website with ease just by dragging the content we need.

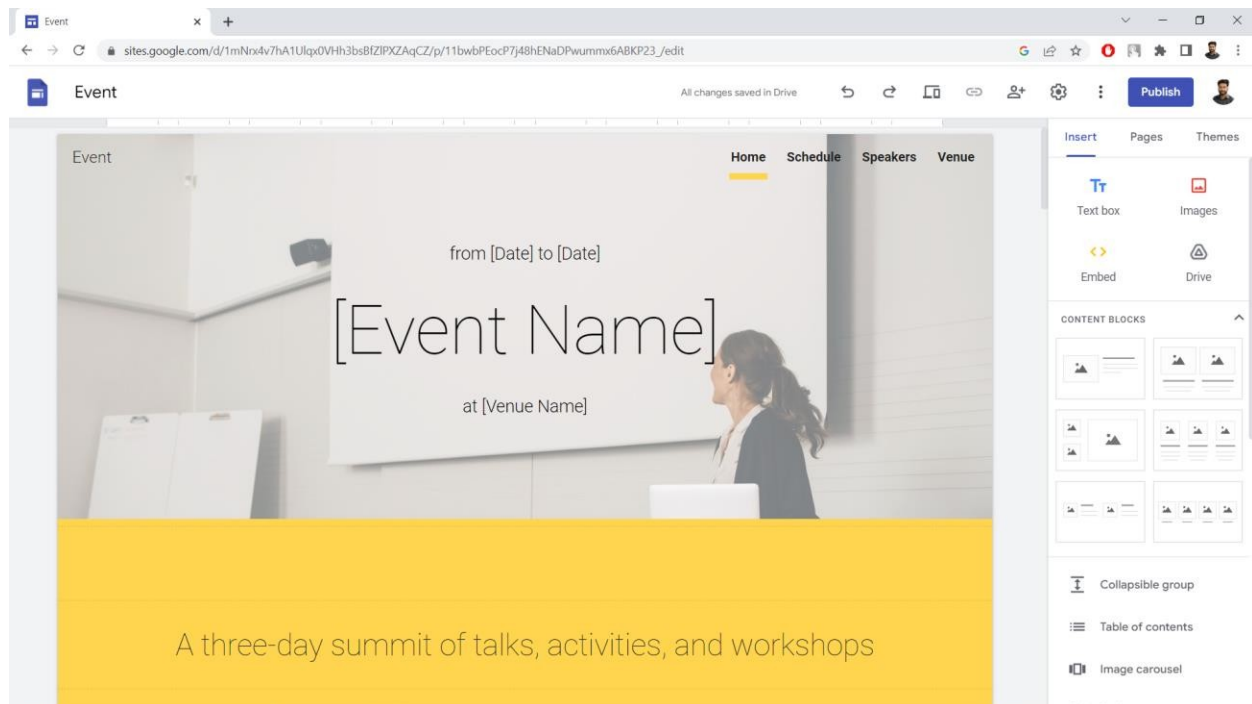
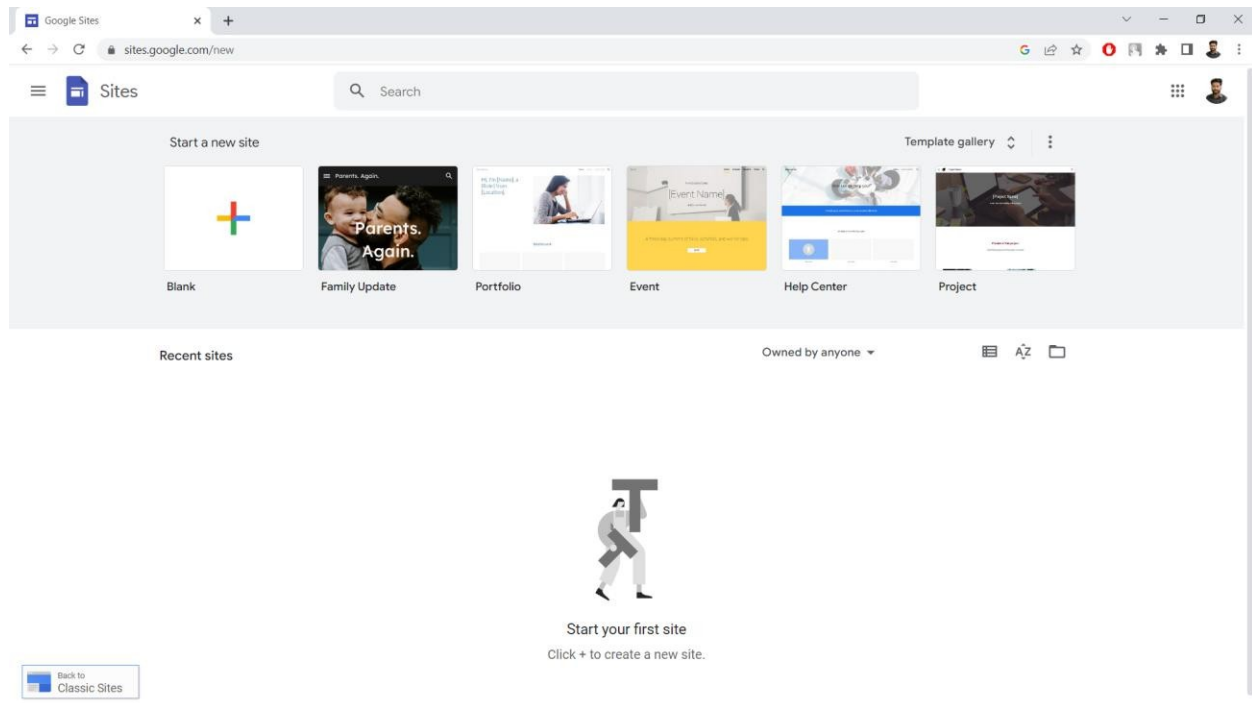
It also allows us to create website with another user as it can give edit access to others. It happens in real time.

It is compatible with other google services like google sheets, google slides, google docs etc.

The site is completely free and there is no limit on number of sites that we can create within 15GB of storage.

No background in coding and web development is required as it is very user friendly and have templates.

It is a good option for a free service, work presentations, small businesses etc. as we can add links, images, videos, text and much more



Sign in to google account and go to google sites homepage.

Pick the template to use under “start new site”. Also there are various options in “Template gallery” out of which “Events” is selected here.

Enter all the required details and contents of the site and once all of this is done, hit Publish
In the pop-up box after hitting Publish, choose the URL you want and can also customize it.
Once finished, click on Publish again to make the website visible to others.

Google Sheets

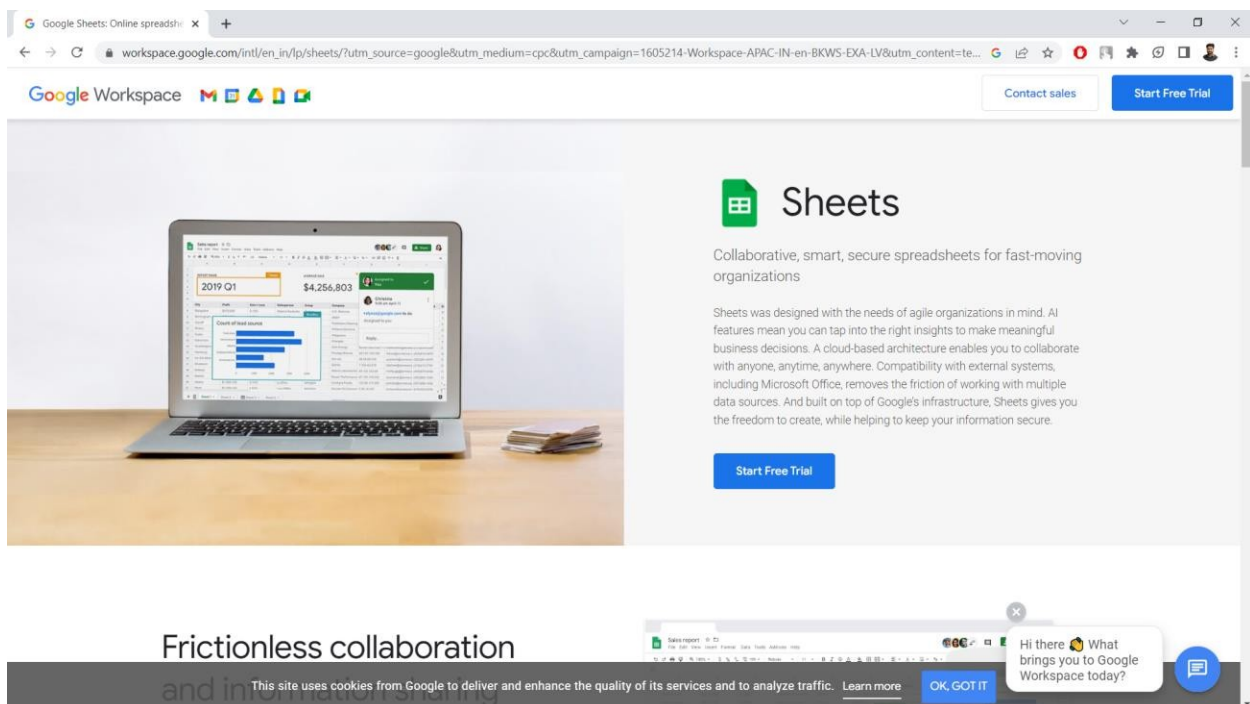
It is a spreadsheet program developed by Google.

It organizes the data into rows and columns and allows you to do mathematical and logical operations on them

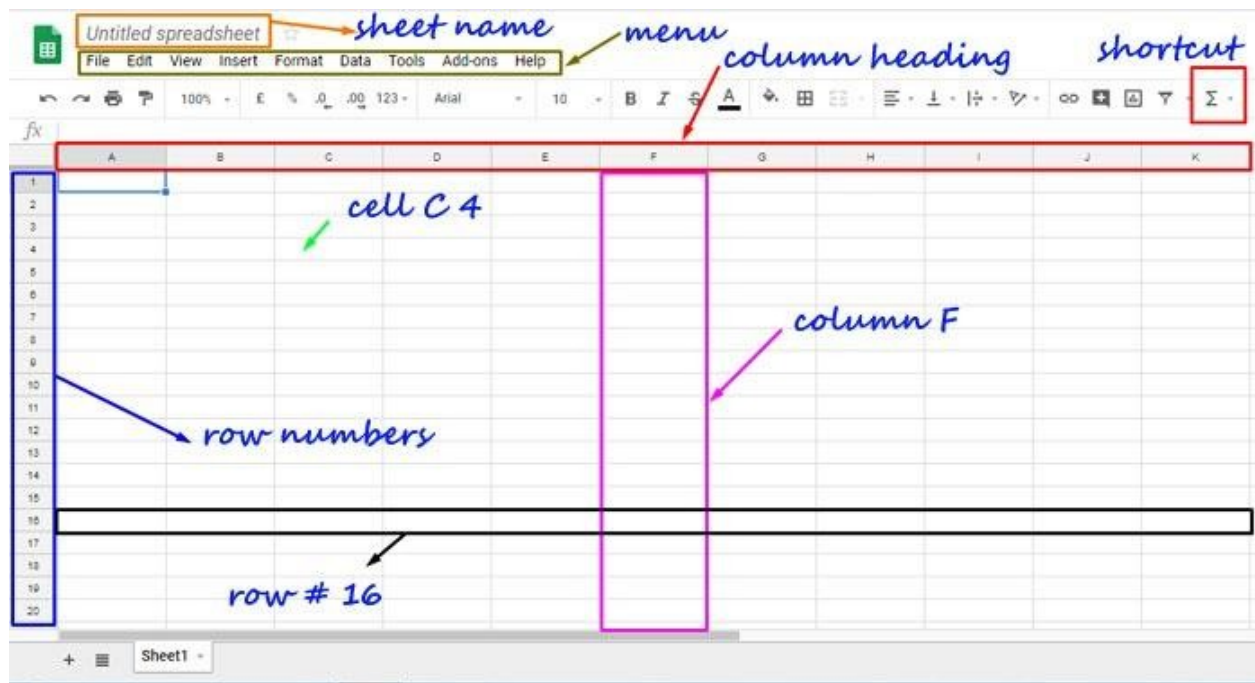
It can be used in daily life as well as work life.

Use of google sheets does not require programming knowledge and does not require downloading or installing of program on computer.

It runs on the web browser.



The screenshot shows the Google Sheets landing page in a web browser. The browser's address bar displays the URL: `workspace.google.com/intl/en_in/tp/sheets/?utm_source=google&utm_medium=cpc&utm_campaign=1605214-Workspace-APAC-IN-en-BKWS-EXA-LV&utm_content=te...`. The page features the Google Workspace logo at the top left and navigation links for "Contact sales" and "Start Free Trial" at the top right. The main content area includes a large image of a laptop displaying a Google Sheet with a bar chart and a table. To the right of the image, the heading "Sheets" is followed by the text: "Collaborative, smart, secure spreadsheets for fast-moving organizations". Below this, a paragraph describes the features of Google Sheets, emphasizing its collaborative nature and integration with other Google services. A "Start Free Trial" button is prominently displayed. At the bottom of the page, a dark banner reads "Frictionless collaboration and information sharing". A cookie notice at the very bottom states: "This site uses cookies from Google to deliver and enhance the quality of its services and to analyze traffic." with a "Learn more" link and an "OK, GOT IT" button. A small chat bubble in the bottom right corner says: "Hi there! What brings you to Google Workspace today?" with a "Chat" button.



Google sheets allows format and styles for the spreadsheet.

It allows change of colors, font type, font size, borders, numbers etc. It allows real time collaborative editing.

It is free to use, require minimal training, customizable and it is collaborative than other similar tools

Online Communication and Conferencing

Online communication means sharing of information or communication over a computer network or telecommunication network. A phone call or online chats are different ways of online communication.

Online Conferencing is a service which allows an audio or video conferencing or meeting through web services. Participants can see, talk and hear to each other in real time.

A **Webcast** is a video broadcast of an event transmitted over the internet.

A **Webinar** is an event held virtually which is attended exclusively by an online audience. Audience can hear and see the presenters but attendees are not seen or heard in the webinar.

A **web meeting** as an audio, web video conferencing solution that combines all services into one online web meeting service. In this, people from different parts of world can see, talk, message each other in real time.

A **Web conferencing** software allows the participants to conduct or attend the web meeting. It enables remote meeting based on VoIP (Voice over Internet Protocol) (Voice call using internet), online video, audio, instant messages, file sharing, screen sharing.

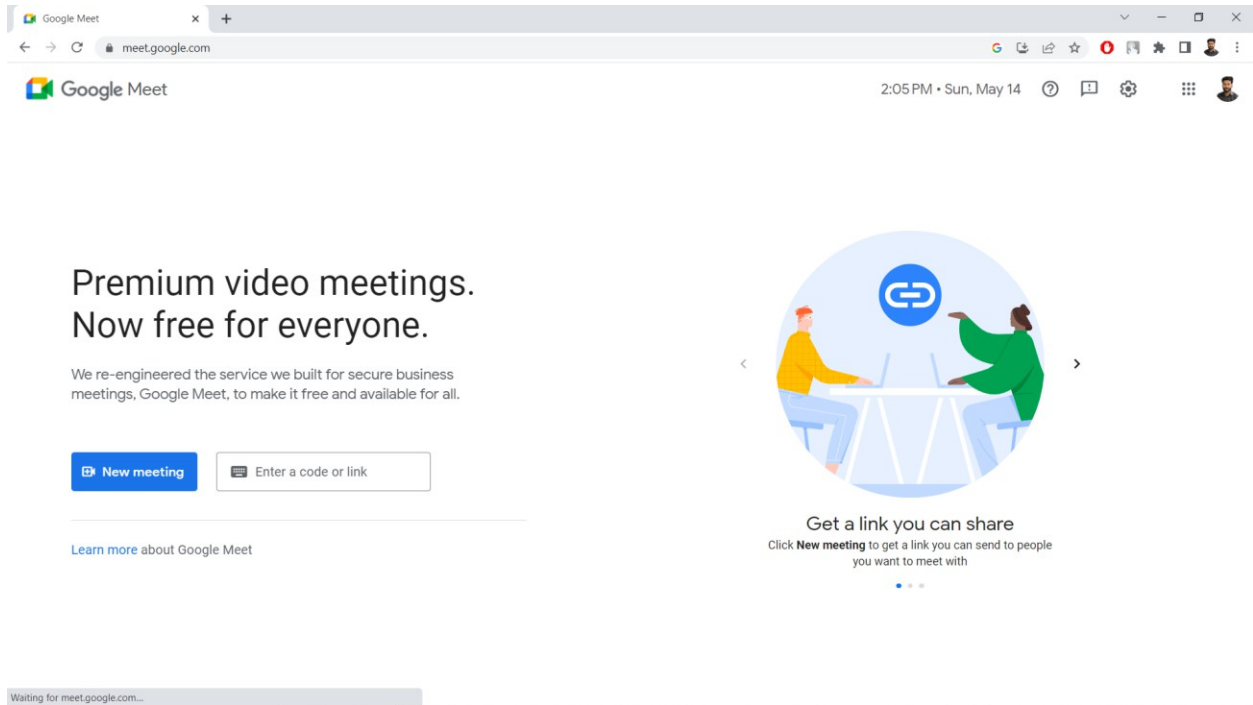
Some examples are Skype, Google meet, Zoom, Cisco webex, Click meeting etc.

Google Meet

Google meet is a video conferencing platform where google allows real-time meetings using the browser, sharing video, desktop, files, screen, presentation with others.

It is not necessary to install in on desktop or phone and can be accessed through browser.

It can be used for audio and video calls where team members can be invited, they can join by a meeting code or by clicking on the meeting link.



WebEx

It is a multifunctional desktop audio/video conference call solution provided by Cisco.

It allows to meet anyone throughout the globe using web services and meetings happen in real time.

It is required to install it on desktop or mobile phone

It is suitable for both small and large group meetings and for audio and video calls

Basic Logic Building

Logic building is essential for computer programming. It involves breaking down the problem into smaller, manageable parts and defining the steps required to solve it.

A program is a sequence of instructions that is written in a computer programming language. Programming is needed to develop various types of software.

A programming language is a formal language comprising a set of instructions that produce various types of outputs.

Steps in Problem solving

Following are the mainly used steps while creating a program

- 1. Problem analysis:** In this phase, the internal logic of the program is planned. Various program analysis techniques are used to represent the logic of the program and flow charts, pseudo codes, algorithms and decision tables are mainly used tools for this purpose. Program analyst performs the analysis phase and he chooses the most efficient way.
- 2. Coding:** After the development of desired logic and sequence of steps, next comes the coding stage. In this stage, a programming language like C and C++ is selected and the program instructions are coded as per syntax of the chosen language. Other languages in use are Java, visual C++ etc.
- 3. Debugging:** After the coding is done, the program is checked for all kinds of syntax and grammatical mistakes. This includes removing of errors due to invalid syntaxes like absence of semicolon (;) or logical error like absence of increment/ decrement step in a while loop.
The process of removing all kinds of error in the program is called debugging.
- 4. Testing:** After removing all the errors from the program, it is executed and supplied with valid input to see whether the program returns the accurate output.

Algorithm:

Algorithm is a sequence of instructions to solve a particular problem. Algorithm is independent of any programming language and can be written in simple English language as it is a representation of instruction sequence of the solution.

A problem may have multiple algorithms for its solution.

The instructions written in an algorithm must have following characteristics:

- a. Each instruction must be precise and unambiguous.
- b. Each instruction should be written in such a manner that it can be performed in a finite time
- c. One or more instructions should not be repeated infinitely. The program should stop after a given number of iterations.
- d. After executing the steps of algorithm, desired result must be obtained.
- e. The variable names of algorithm must represent the entity they represent in the program. Example, a variable to represent basic salary should be named basic_sal or b_sal etc.

Example 1: Consider a box where no one can see what is happening inside, it is covered on all sides. We give input to the box and it gives output we need but the procedure behind this conversion of input to output is an Algorithm.

Example 2: Write an algorithm to find the average of three subjects. Step 1:

Start

Step 2: Declare and read 3 subjects, let's say S1, S2, S3

Step 3: Calculate the sum of all the 3 subject values and store result in sum variable (Sum = S1+S2+S3)

Step 4: Divide sum by 3 and assign it to Average variable (Average = Sum/3) Step 5: Print the value of Average of 3 subjects

Step 6: Stop

Example 3: Write an algorithm to count number of males out of 1000 people of a town.

Step 1: Start

Step 2: Initialize GENDER, COUNT and MALE to zero Step 3:

Input gender of the person

Step 4: If gender = male, Increment male and count by 1 If gender
≠ male, Increment count by 1

Step 5: Check count to see if it is less than 1000 Step 6: If
count < 1000, repeat from step 3

Step 7: Repeat till Count = 1000 Step 8:

Print MALE

Step 9: Stop

Steps for Algorithm development

It is a series of specific steps which solve a particular problem and which the programmer can translate into a computer program in some programming language.

There are five major steps:

Step 1: Obtain a description of problem

The problem description must be stated clearly, it must be unambiguous, it must be complete without internal contradictions

Step 2: Analyze the Problem

This step is to determine the starting and end point for solving the problem. At the starting point, we look at the data available and at the end point, we look at the new facts that we have.

Step 3: Develop a high-level algorithm

High-level algorithm means having high level of detailing in the planning. Each step is detailed out to further level of detailing. It shows the major steps that need to be followed to solve a problem.

Step 4: Refine the algorithm by adding more details

More details are added to the steps and the level of detailing depends upon the situation. Each time more detail is added to the previous algorithm.

Step 5: Review the algorithm

The algorithm needs to be analyzed step by step to determine whether or not it will solve original problem

Flowchart:

A flowchart is a graphical method of representing the logical flow of the program. It uses different shapes to denote different types of instructions and actual instructions are written within these shapes.

Different shapes or boxes of a flowchart are connected by solid lines which indicate the flow of program. Program flow is the exact sequence in which the instructions are to be executed.

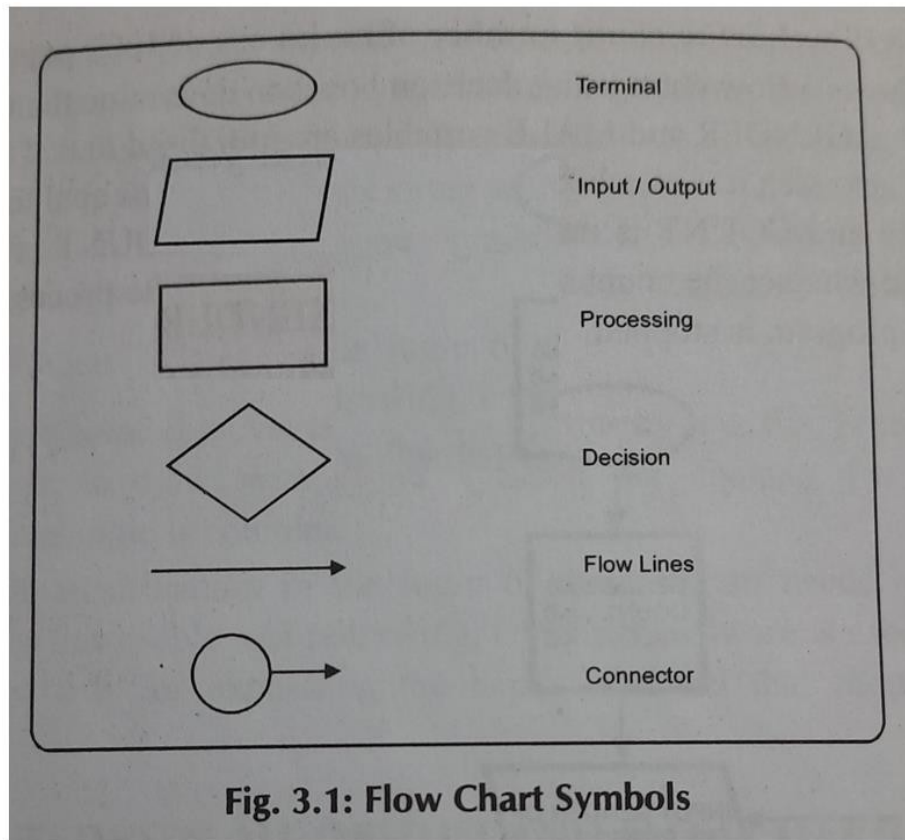
While generating solution for a problem, an algorithm is created first and then it is represented through flow chart.

It is easier to trap any kind of logical error in a flow chart as compared to an algorithm.

Flowchart Symbols: A flowchart uses different symbols to represent different functions in the program.

representing decision in the program etc. The figure 3 shows the symbols used in flow charts. Following is the description of various symbols used in flow chart.

1. **Terminal:** The terminal symbol is used to indicate the beginning (START), ending (STOP) and pauses (HALT) in the program's logical flow. The first and the last symbol in the flow chart is generally a terminal symbol. The terminal symbol is in a shape of an oval.
2. **Input/output:** The input/output symbol is used to denote any function of an input/output device in the program. It is used when an input is taken from the user or output is displayed to the user. The shape of an input / output symbol is like a parallelogram.
3. **Processing:** A processing symbol is used in flowchart to represent arithmetic and data movement instructions. It is used in the flow chart, whenever we face addition, subtraction, multiplication and division of numbers. The logical process of moving data from one to other location of the main memory is also denoted by this symbol. The processing symbol is represented by a rectangle in flow chart.
4. **Flow Lines:** Flow lines with arrowheads are used to indicate the flow of operation or execution of a program. Flow lines indicate the exact sequence in which the instructions are to be executed. These flow lines are very important to represent a situation when, normal flow of top to bottom is not required. One should be careful that two flow lines should not intersect with each other.
5. **Decision:** While developing solutions for commonly faced practical problems, a program generally has multiple execution paths and it is decided at a point that in which direction the program control or execution will flow. A decision symbol is used in the flow chart, at a point where a number of options are available to the user and the user has to select one way depending upon the input supplied by the user. The condition upon which the choice has to be selected, is written in the decision box. Depending upon the condition result, an appropriate path is selected. The decision box is represented by a diamond in the flowchart.
6. **Connector:** Connector symbol is used to extend a very long flow chart on next page. When a flow chart becomes very long, flow lines start crossing each other and understandability of flow chart reduces so, to extend the flow chart to the next page we use connector symbols. Connector is represented by a circle with an arrow.

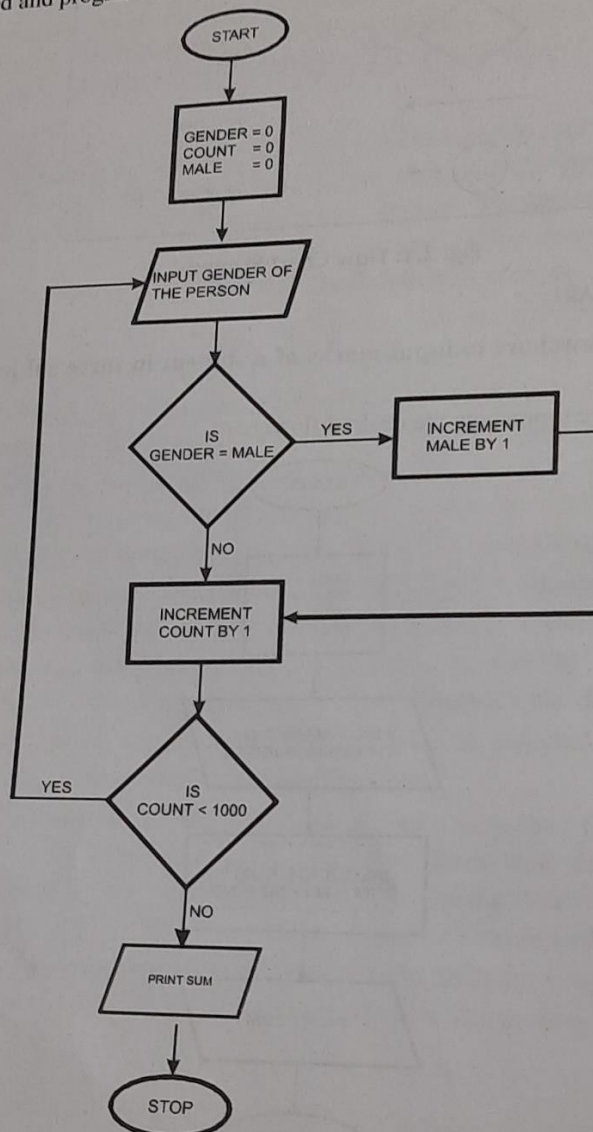


Limitations of flow charts:

1. Flowcharts are very time consuming.
2. They are difficult to draw with proper symbols and spacing.
3. A little modification in the logic of program needs redrawing the whole flowchart again.
4. There are no set standards for explaining the depth of detail that should be included in a flowchart.

Example:

Example 2: Create a flowchart to count number of males out of 1000 people of a town.
Ans. This example shows a flow chart using decision boxes to determine the flow of the program. Firstly the COUNT and GENDER and MALE variables are initialised to 0. Then the GENDER of person is read. In the next step it is checked to see, if the GENDER is equal to MALE. if yes, then MALE is incremented and COUNT is incremented. if no, only COUNT is incremented. In the next step, it is checked whether the count is less than 1001. If yes, the process is repeated else the MALE is printed and program is stopped.



Differences between Algorithm and Flowchart

1. Algorithms can be written in a simple language whereas flowcharts are visual diagrams.
2. An algorithm is a set of instructions whereas a flowchart is a graphical representation of those instructions.
3. Algorithms are more precise and can be used to solve any problem whereas flowcharts are more general and are used to understand algorithms.
4. Algorithms focus on the sequence of steps to solve a problem whereas flowcharts focus on the flow of data.
5. Algorithms are easier to modify whereas flowcharts can be difficult to modify
6. Algorithm came from Persian mathematician Al Khwarizmi whereas Flowchart was introduced by Frank Gilberth.

Office Tools

Very Short Answer Questions: (02 Marks)

1. Define office tool.

Answer: Office tools are application software that help the user to perform office related tasks easily and efficiently. These tools help user to create, edit, manage and manipulate large amount of documents and data. Example: Libre Office, MS Office

2. Name any two freely available office tools.

Answer: Open Office and LibreOffice are two freely available office tools.

3. What is Calc?

Answer: Calc is a spreadsheet application of LibreOffice. It contains all the advanced analysis, charting and decision making features expected from a spreadsheet.

4. What do you mean by auto formatting?

Answer: Auto formatting in OpenOffice refers to the automatic application of formatting styles and settings to text and documents based on predefined rules. It can save time and help maintain consistency in the documents. Can auto format paragraph style and character style.

5. Define hyperlink.

Answer: A hyperlink is a link or web link. It is an icon, graphic or text that links to another file or object. When you click on a link, it takes you to the target of the link which maybe a webpage, document or other online content then it is called hyperlink.

6. What are book marks?

Answer: A bookmark is an object which is used to record a location in a word document. Bookmarks are listed in the navigator and you can insert a bookmark at the cursor position. Go to “Insert” then “Bookmark”.

7. What do you mean by grouping of cells?

Answer: Grouping of cells in a spreadsheet refers to the action of combining multiple adjacent cells into a single, larger cell. This grouping helps organize and manage data in a good manner.

8. Write steps to insert new sheet in the workbook.

Answer: The steps are as follows

- a. Open the Calc workbook.
- b. Click on the sheet that is adjacent to where you want to insert the new sheet.
- c. Right-click on the selected sheet tab.
- d. Choose "Insert Sheet":

9. Write method to rename a sheet in workbook.

Answer:

- a. Open the Excel workbook.
- b. Click on the sheet tab at the bottom of the Excel window to select the sheet you want to rename.
- c. Right-click on the selected sheet tab.
- d. Choose "Rename"
- e. Type New Name
- f. Press Enter

10.What are nested functions?

Answer: Nested functions refer to the practice of using one function as an argument within another function in spreadsheet context.

In simpler terms, you incorporate one function's output as input for another function.

11.What is the role of navigator?

Answer: The navigator allows you to see all the components of the document such as headings, tables, objects, pictures, text marks etc. The navigator is located on standard toolbar.

Short Answer Questions: (04 Marks)

1. What tools are generally present in an Office tool suite?

Answer: Some of the MS Office tools are

- a. **Microsoft Word:** It is a word processor that helps user to create, edit, manipulate text documents such as letters, reports, resume etc.
- b. **Microsoft Excel:** It is an electronic spreadsheet program that helps users to create workbook, store, organize and manipulate data in simple and complex spreadsheets.

- c. **Microsoft PowerPoint:** It helps to create presentations and visually display information in form of simple slide show to professional multimedia presentations.
- d. **MS OneNote:** It is digital alternative of paper notebook provided by MS Office. It helps user to create, organize and spare note easily.
- e. **MS Access:** It is a database management system. It helps to link and use data from other sources, create and manipulate databases and create simple business applications.
- f. **MS Outlook:** It helps user to manage personal information, emails etc. It can also be used to store contact information, calenders, organize meetings, manage tasks etc.
- g. **MS Publisher:** It is a graphic design application that gives users creating material for publications and marketing in form of layouts and design of documents.

2. Name various components of Open Office tool. Also define the open office.

Answer: OpenOffice, is a free and open-source office suite that provides a set of productivity tools for word processing, spreadsheet calculations, presentations graphics, databases, and more.

Various components of Open Office tool are

- a. **Writer:** A word processing application similar to Microsoft Word. It is used for creating and formatting text documents, reports, and letters.
- b. **Calc:** A spreadsheet application comparable to Microsoft Excel. Calc is used for performing calculations, creating charts, and analyzing numerical data.

- c. **Impress:** A presentation application similar to Microsoft PowerPoint. Impress is used for creating slideshows, presentations, and multimedia-rich content.
- d. **Draw:** A vector graphics editor that allows users to create diagrams, flowcharts, and other illustrations.
- e. **Base:** A database management application similar to Microsoft Access. Base is used for creating and managing databases, creating forms, and running queries.
- f. **Navigator:** A tool that aids in navigating and managing different elements within documents. It provides an overview of the document structure and allows users to easily move between sections.

3. Write steps to insert image in Writer using drag and drop.

Answer:

- a. Open the document in which you want to insert the image.
- b. Open the File Explorer (Windows) and locate the image file you want to insert into your Writer document.
- c. Resize and arrange the Writer window and the File Explorer so that both are visible on your screen.
- d. Select and Drag the Image
- e. Click and hold the left mouse button on the image file you want to insert.
- f. While holding the mouse button, drag the image file from the File Explorer into the open Writer document.
- g. Drop the image into the Writer document.

4. Write advantages and disadvantages of linking of image file.

Answer:

Advantages of Linking Image Files:

- a. Reduced Size of the document

- b. Ease of Update of image file outside the document
- c. Same image can be used in multiple documents without having to add it separately in each file
- d. Documents with linked images may load faster because the file size is smaller.

Disadvantages of Linking Image Files:

- a. Linked images create a dependency on external files. If the linked image file is moved, deleted, or inaccessible, the image may not display correctly in the document.
- b. When sharing documents, it's essential to ensure that linked image files are included otherwise image would not be there.
- c. Linking makes the document complex
- d. If the linked image file is renamed, moved, or deleted, the image will not be displayed, leading to potential issues in document presentation.

5. Write any eight advantages of LibreOffice over other office suits.

Answer: Some advantages are

- a. Libreoffice is free to use. It has no license fee.
- b. It is an open source software with open source license.
- c. It is easy to learn, use and master.
- d. It runs on multiple operating systems including windows, Mac OS, Linux etc.
- e. It provides extensive language support
- f. The components of LibreOffice are well integrated with one another and can be used with one another.
- g. It supports many common formats including HTML, XML, PDF etc.
- h. There is no vendor lock-in in LibreOffice. The files are easily unzipped and read by any text editor.

6. Name various menus in Menu bar of LibreOffice main window.

Answer: Various menus are

- a. **File:** Options like opening, saving, and printing documents.

- b. **Edit:** Options cut, copy, paste, and other editing operations.
- c. **View:** Settings such as zoom levels, toolbars, and the sidebar.
- d. **Insert:** Options for inserting images, tables, charts, and more.
- e. **Format:** Options for formatting text, paragraphs, and other document elements.
- f. **Styles:** Managing and applying styles to text, paragraphs, and page elements.
- g. **Table:** Options related to working with tables
- h. **Tools:** Various tools for spell checking, grammar checking, language settings, and other utilities.
- i. **Window:** Options for managing multiple open documents and arranging document windows.
- j. **Help:** Access to the LibreOffice Help system and other help-related resources.

7. Name various cell formats allowed by OO Calc.

Answer: Various formats are

- a. **Number:** Formats numbers for general display.
- b. **Date:** Formats cells to display dates.
- c. **Time:** Formats cells to display time.
- d. **Currency:** Formats numbers as currency, including a currency symbol.
- e. **Percentage:** Converts numbers into percentages
- f. **Fraction:** Displays numbers as fractions.
- g. **Scientific:** Formats numbers in scientific notation
- h. **Text:** Treats the cell content as text
- i. **Boolean:** Formats cells to display "TRUE" or "FALSE" for Boolean values.
- j. **Custom:** Allows you to create custom formats using a combination of symbols, letters, and placeholders.

8. Write the operations of following four functions in Calc – WEEKDAY, YEARS, DATEVALUE, ISLEAPYEAR.

Answer:

WEEKDAY: Returns the day of week for a given date
 YEAR: Return the year of a given date

DATEVALUE: Returns a date-time serial number from a text date ISLEAPYEAR:

Tests if a date is in a leap year

9. What is a formula in Calc? Explain with help of examples.

Answer: A formula is an expression that performs calculations or operations on data within a spreadsheet.

All formulas in Calc begin with an equal sign (=).

A cell reference is the address of a cell in the spreadsheet, identified by its column letter and row number. For example, A1 refers to the cell in the first column and first row.

Example: =SUM(A1:A5) adds the values in cells A1 through A5.

10. Write four rules and methods for creating functions in Calc.

Answer: There is need of specific rules and methods for creating functions in Calc

- a. Always place a unique formula in each cell
- b. Use array formula on massive data
- c. Use consolidation functions
- d. Use macros to create functions
- e. Try to break formula into parts and combine the parts where needed
- f. Use multi-threading

11. What is OO Impress? Write any four uses of it.

Answer: Impress is the tool available in open office suite that creates effective multimedia presentations that stand out with 2D and 3D clip art, special effects, animation.

Uses:

- a. Creating effective multimedia presentations with 2D and 3D clip art, special effects, animation
- b. Preparing presentations with master pages or download templates

- c. Easy to use drawing and diagram tools with animation and effects.
- d. Impress allows users to export presentations in various formats, including PDF

12. Write steps to insert new slide in impress document.

Answer:

Method 1:

1. Open the presentation in which you want to insert a new slide.
2. Click on the slide on the left side of the main window where you want the new slide
3. Go to the “Insert” menu in the top menu bar.
4. Choose “Slide” from the dropdown menu.
5. Can choose "Slide Layout" from the dialog box
6. Click OK to insert the new slide with the chosen layout.

Method 2:

1. Right-click on the slide on the left side of the main window.
2. From the context menu, choose New Slide.
3. Select the desired slide layout.
4. Click OK.

Long Answer Questions: (08 Marks)

1. What is Open Office Writer? List its important features.

Answer: It is a word processing application of Open Office tools suit. It helps user to create documents like letters, reports, resume, books etc.

The Writer allows to insert images, graphics, charts etc. from other components to its documents.

It is a powerful tool for creating professional documents. It allows creation, editing and viewing any Microsoft word document in both doc and docx format.

Apart from usual features of word processor, there are some additional features like

- a. Built in drawing tools
- b. Templates and styles
- c. Linking of graphics, spreadsheets and objects
- d. Export to PDF
- e. Database integration

2. Explain character formatting in Writer document.

Answer: Character formatting involves modifying individual characters or text within the document. This includes adjustments to the font, size, color, style, and other attributes to enhance the visual presentation.

Various options for character formatting are:

- a. Style and formatting window
- b. Apply style
- c. Font name
- d. Font size
- e. Bold, Italic, Underline
- f. Superscript, Subscript
- g. Increase font size and decrease font size
- h. Font color
- i. Highlighting
- j. Background color
- k. Character format dialog

3. What is table? Explain insertion and deletion of table in writer document.

Answer: A table is a grid of rows and columns that intersect to form cells. The lines marking the cell boundaries are called grid lines. Open office writer allows to create and insert table in documents.

Inserting a Table:

Method 1:

- a. Click where you want to insert the table.

- b. Go to **Table** in the top menu.
- c. Choose **Insert** and then **Table....**
- d. Set the number of rows and columns.
- e. Click OK.

Method 2: Using Table icon

- a. Open the document
- b. Click where you want to insert the table.
- c. Click the arrow to the right side of the “Table” icon
- d. In the drop down grid, select the number of rows and columns for the table
- e. The table will appear at the location of our cursor.

Deleting a Table:

- a. Click inside the table you want to delete.
- b. Go to **Table** in the top menu.
- c. Choose **Delete** and then **Table**.
- d. Click **Yes** in the confirmation dialog.

4. What is reference range operator in Calc? Explain its use with example.

Answer: In Calc, the reference range operator is used to specify a range of cells in a formula or function. The colon (:) is the reference range operator, and it is used to indicate a range of cells between two cell references.

Start cell : End Cell

A reference operator selects a range of cells in form of rectangular selection thus selecting from upper left corner to lower right corner.

Example:

=SUM(A1:A5)

In this example:

A1 is the starting cell. A5 is
the ending cell.

The formula SUM(A1:A5) instructs Calc to sum the values in the range of cells from A1 to A5, inclusively.

5. Explain insertion of Graphic Image/Picture into calc document.

Answer: There are four ways of inserting images

- a. Using insert picture dialog:** Click in the location where you want to insert the image in document, then choose “Insert > Picture > From File” or Click on the “Insert picture icon” on picture toolbar.
- b. Using drag and drop:** Open the file browser window and locate the image you want to insert. Then drag the image in calc document and drop it where you want it to appear.
- c. Inserting from the gallery:** Go to “Tools > Gallery”, then click on gallery icon. Find the desired picture and right click on it or choose “Insert > Copy”.
- d. By copy and pasting using clip board:** Open the calc document and the source document from which image is to be added. In the source document, select the image to be copied and press “Control+C”. Now switch to calc window and place the cursor where the image is to be inserted then press “Control+V”

6. Explain main blank window of OO Impress along with the panes in it.

Answer: The main blank window of OpenOffice Impress consists of tools and features needed to create and edit presentations.

Various panes in it are

- a. The slides pane:** It contains thumbnail pictures of the slides in the presentation and they are shown in order. Several operations are possible like addition of new slides at any place, marking a slide hidden, deleting a slide, renaming a slide, changing the slide transition, changing the sequence of slides, changing the slide design, copying or moving the content of one slide to another.

- b. **The tasks pane:** It is visible at the right of workspace. It gives access to interface controls and it has sections namely Master pages, layout, table design, custom animation, slide transition.
- c. **The master page:** It is used to define the page style for the presentation. Impress already contains 28 master pages. By default it is blank and rest have a background.
- d. **The layout:** in this, 20 layouts are shown out of which you can choose one and can also modify it as per requirement.
- e. **The table design:** There are 11 standard table styles provided in table design pane and the appearance of the table can be modified.
- f. **Custom animation:** There are variety of animations for one element of a slide and animation can be added to a slide.
- g. **Slide transition:** There are 56 slide transitions available in this pane and the transition speed can be selected. Time can also be set for automatic transition.
- h. **The Workspace:** It has 5 tabs namely Normal, Outline, Notes, Hand-out and Slide sorter. They are called view buttons. The workspace is below the view button.

7. Explain the slide show steps in OO Impress.

Answer:

- a. Open the presentation file you want to present.
- b. Click on the "Slide Show" menu in the menu bar and select "Slide Show" from the dropdown. OR Click on the "Slide Show" button on the toolbar.
- c. Some options can be set before starting the slide show like "Slide transition", "Slide transition speed", "Loop", "Navigation"
- d. If we want to start from the first slide, click on "From Beginning" in the Slide Show menu.
- e. Navigate the slide show using mouse left click or keyboard arrows

- f. To end the slideshow at any point, right-click or press 'Esc.' This will exit the Slide Show mode.

8. What is custom slide show? Write steps to set-up a custom slide show.

Answer: A custom slide show in OpenOffice Impress allows you to create a subset of slides from your presentation and present only those selected slides.

Steps to Set Up a Custom Slide Show:

- a. Open the presentation file you want to create a custom slide show
- b. Click on the "View" menu in the menu bar.
- c. Select "Slide Sorter" from the dropdown menu.
- d. In Slide Sorter view, click on the slides you want to include in your custom slide show.
- e. After selecting the slides, go to the "Slide Show" menu in the menu bar.
- f. In the Slide Show menu, hover over "Slide Show Settings" and select "Custom Slide Show."
- g. In the Custom Slide Show dialog box, click on the "New" button and enter its Name
- h. Click on the "Add" button to add the selected slides to your custom slide show.
- i. We can set the order of slides or can also delete any slide.
- j. Click on "OK" button to save your custom slide show
- k. To start your custom slide show, go to the "Slide Show" menu, hover over "Slide Show Settings," and select your custom slide show from the list.
- l. Navigation controls are same as mouse left click and keyboard arrow.
- m. To end the custom slide show, right-click or press 'Esc.'

9. Define slide master and slide design. Write steps to create slide master.

Answer:

Slide Master: In OpenOffice Impress, a Slide Master is a template that contains the overall layout and formatting for the slides in a presentation. By modifying the Slide Master, you can ensure consistent design and formatting across all slides in your presentation. Changes made in the Slide Master apply to all slides linked to it.

Slide Design: A Slide Design is a collection of design elements, such as background styles, color schemes, fonts, and placeholders, that can be applied to individual slides or the entire presentation. Slide Designs provide a quick way to change the overall look and feel of your slides without directly modifying the Slide Master.

A slide master can be created by modifying the default slide master.

The steps are:

- a. Select “View > Master > Slide Master”
- b. Click the “New Master” icon on the master view toolbar and a second slide master will appear in slide pane.
- c. Modify this slide master to suit the requirements and rename it.
- d. When completed, close the master view toolbar to return to normal slide editing mode.

10. What is custom animation? Write steps to add animation effects to your presentation.

Answer: Custom animation OpenOffice Impress, refers to the ability to apply specific and personalized animation effects to individual elements on a slide. Instead of applying a generic animation to the entire slide, custom animation allows you to control how each element appears, moves, or exits during a presentation.

Steps to add animation effect:

- a. Open the presentation file
- b. Click on the "View" menu in the menu bar.
- c. Choose either "Slide Sorter" or "Normal" view
- d. Click on the slide to which you want to add animation effects.
- e. Click on the "Slide Show" menu in the menu bar.
- f. Select "Custom Animation" from the dropdown menu
- g. Click the "Add" button to add an animation effect to an element on the selected slide

- h. select the type of animation effect you want to apply and adjust its speed or duration etc.
- i. Preview the animation
- j. Can also remove the animation
- k. Once animation is added, close the custom animation pane
- l. Run the slide show to see the animation.

Subject- 1.6 Environment Studies And Disaster Management

OMCA-1ST

ECOLOGY

Ecology is the study of interactions between living things and the environment. An ecosystem is the combination of living things, such as plants, animals and microscopic organisms, plus environmental factors such as temperature, rain and sun light and ecology studies all of these aspects of an ecosystem. As a science, ecology is a broad field and includes a number of different sciences such as biology, physics, chemistry and geology.

Organisms and the environment both effect each other. For example, a plant is affected by rain and sun light but environment beneath the plant is influenced by the plant because it reduces the amount of light, drops leaves, reduces the temperature and so on. Additionally, living things influence each other through competition, predation and other relationships. Environmental factors are often referred to as abiotic factors and relationships between living things are often called biotic factors.

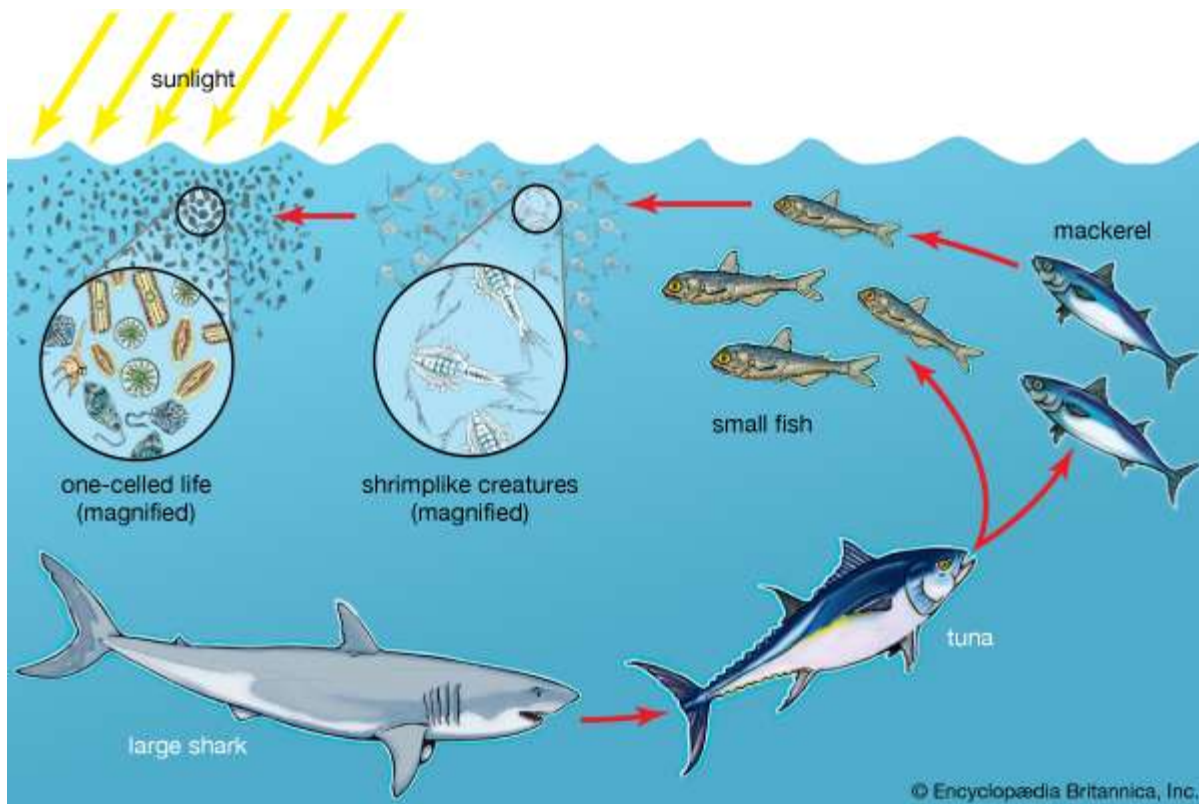
ECOSYSTEM

Ecosystem can be categorized into its abiotic constituents, including minerals, climate, soil, water, sunlight, and all other nonliving elements, and its biotic constituents, consisting of all its living members. Linking these constituents together are two major forces: the flow of energy through the ecosystem, and the cycling of nutrients within the ecosystem.

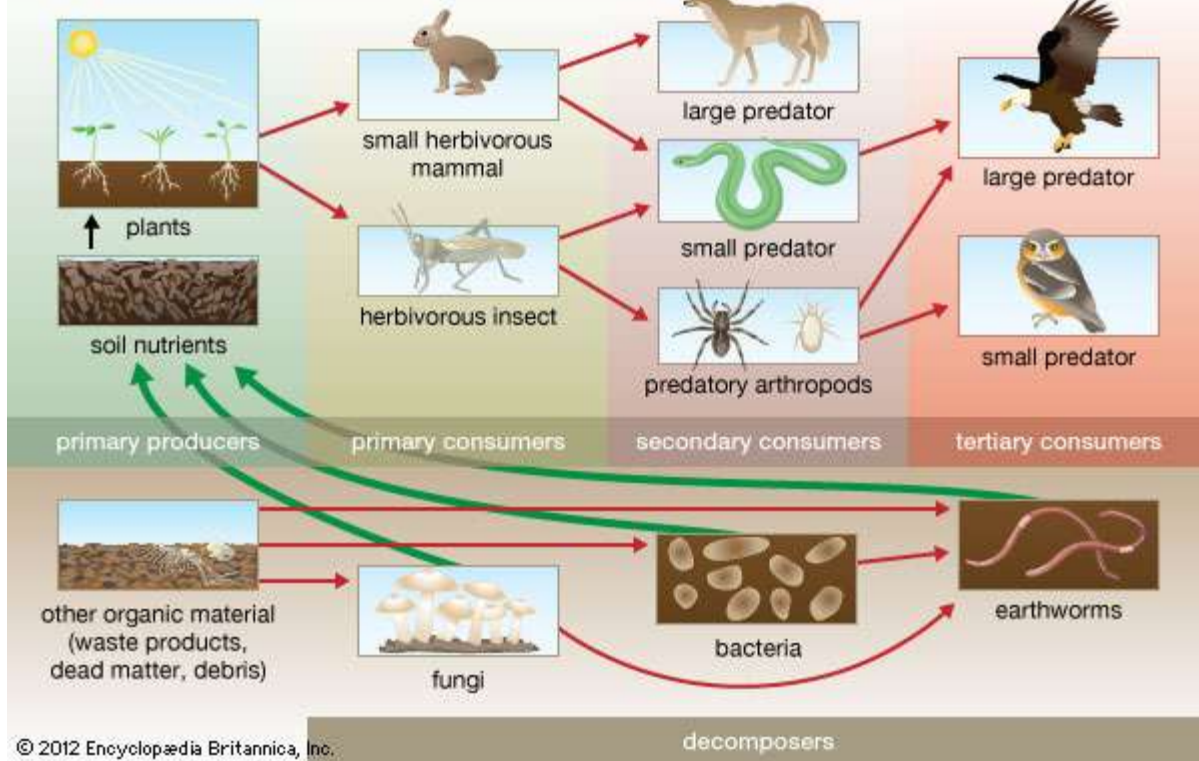
The fundamental source of energy in almost all ecosystems is radiant energy from the Sun. The energy of sunlight is used by the ecosystem's autotrophic, or self-sustaining, organisms. Consisting largely of green vegetation, these organisms are capable of photosynthesis—i.e., they can use the energy of sunlight to convert carbon dioxide and water into simple, energy-rich carbohydrates. The autotrophs use the energy stored within the simple carbohydrates to produce the more complex organic compounds, such as proteins, lipids, and starches, that maintain the organisms' life processes. The autotrophic segment of the ecosystem is commonly referred to as the producer level.

Organic matter generated by autotrophs directly or indirectly sustains heterotrophic organisms. Heterotrophs are the consumers of the ecosystem; they cannot make their own food. They use, rearrange, and ultimately decompose the complex organic materials built up by the autotrophs. All animals and fungi are heterotrophs, as are most bacteria and many other microorganisms.

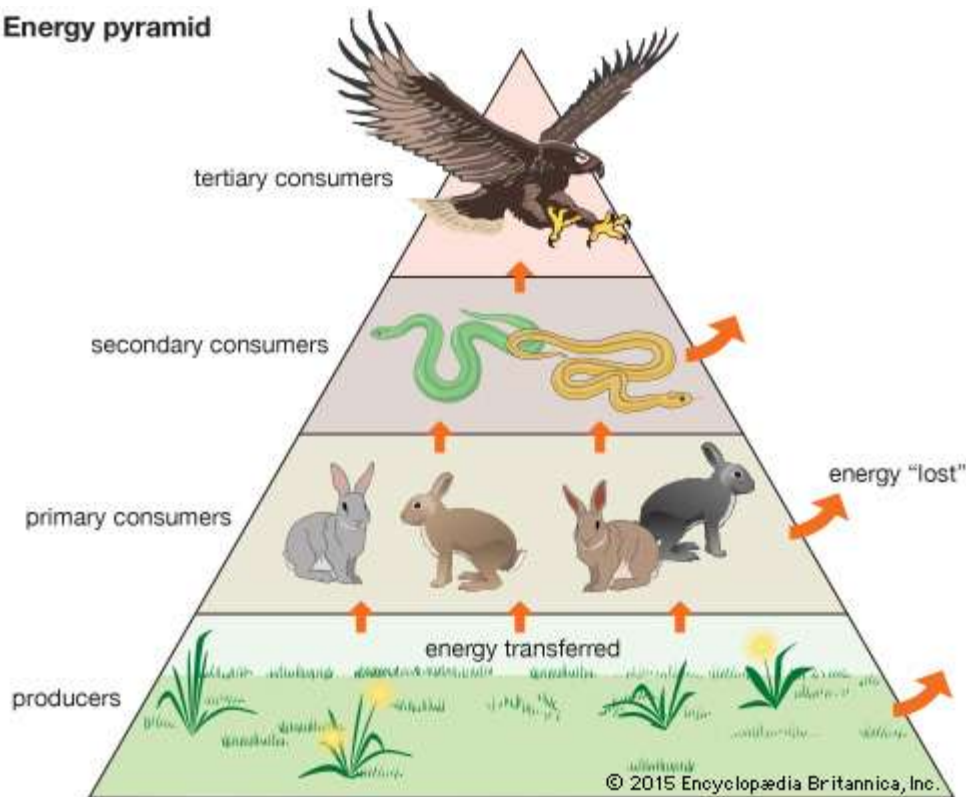
the ecosystem: the producer level, composed of those organisms that make their own food; the primary consumer level, composed of those organisms that feed on producers; the secondary consumer level, composed of those organisms that feed on primary consumers; and so on. The movement of organic matter and energy from the producer level through various consumer levels makes up a food chain. For example, a typical food chain in a grassland might be grass (producer) → mouse (primary consumer) → snake (secondary consumer) → hawk (tertiary consumer). Actually, in many cases the food chains of the ecosystem overlap and interconnect, forming what ecologists call a food web. The final link in all food chains is made up of decomposers, those heterotrophs that break down dead organisms and organic wastes. A food chain in which the primary consumer feeds on living plants is called a grazing pathway; that in which the primary consumer feeds on dead plant matter is known as a detritus pathway. Both pathways are important in accounting for the energy budget of the ecosystem.



Terrestrial food chain



Energy pyramid



A food chain in the ocean begins with tiny one-celled organisms called diatoms. They make their own food from sunlight. Shrimplike creatures eat the diatoms. Small fish eat the shrimplike creatures, and bigger fish eat the small

terrestrial food chain The terrestrial food chain featuring producers, consumers, and decomposers.

Energy Pyramid

An energy pyramid is a model that shows the flow of energy from one trophic level to the next along a food chain. The pyramid base contains producers—organisms that make their own food from inorganic substances. All other organisms in the pyramid are consumers. The consumers at each level feed on organisms from the level below and are themselves consumed by organisms at the level above. Most of the food energy that enters a trophic level is “lost” as heat when it is used by organisms to power the normal activities of life.

SUSTAINABLE DEVELOPMENT

Increasing recognition that the overall goals of environmental conservation and economic development are not conflicting but can be mutually reinforcing, has prompted calls for ‘environmentally sustainable’ economic development. Although there are difficulties in defining sustainable development in an analytically rigorous way, there is still a need to evolve a concept of sustainability that both distinguishes it from other post-war meanings of development and is useful for practical analysis and policymaking.

Nonrenewable and Renewable Energy Resources

Renewable Resources

Renewable resources are resources that are replenished by the environment over relatively short periods of time. This type of resource is much more desirable to use because often a resource renews so fast that it will have regenerated by the time you've used it up.

Think of this like the ice cube maker in your refrigerator. As you take some ice out, more ice gets made. If you take a lot of ice out, it takes a little more time to refill the bin but not a very long time at all. Even if you completely emptied the entire ice cube bin, it would probably only take a few hours to 'renew' and refill that ice bin for you. Renewable resources in the natural environment work the same way.

Solar energy is one such resource because the sun shines all the time. Imagine trying to harness all of the sun's energy before it ran out! Wind energy is another renewable resource. You can't stop the wind from blowing any more than you can stop the sun from shining, which makes it easy to 'renew.'

Any plants that are grown for use in food and manufactured products are also renewable resources. Trees used for timber, cotton used for clothes, and food crops, such as corn and wheat, can all be replanted and regrown after the harvest is collected.

Animals are also considered a renewable resource because, like plants, you can breed them to make more. Livestock, like cows, pigs and chickens, all fall into this category. Fish are also considered renewable, but this one is a bit trickier because even though some fish are actually farmed for production, much of what

we eat comes from wild stocks in lakes and oceans. These wild populations are in a delicate balance, and if that balance is upset by overfishing, that population may die out.

Water is also sometimes considered a renewable resource. You can't really 'use up' water, but you also can't make more of it. There is a limited supply of water on Earth, and it cycles through the planet in various forms - as a liquid (our oceans), a solid (our polar ice caps and glaciers) and a gas (as clouds and water vapor).

Liquid water can be used to generate hydroelectric power, which we get from water flowing through dams. This is considered a renewable resource because we don't actually take the water out of the system to get electricity. Like sunshine and wind, we simply sit back and let the resource do all the work!

Geothermal energy is a renewable resource that provides heat from the earth - 'geo' means 'earth' and 'thermal' means 'heat.' You know all of those volcanoes on Earth that spew hot lava when they erupt? That lava has got to come from somewhere, right? It's actually sitting underneath the earth's surface as incredibly hot rock and magma.

Non-renewable resource

non-renewable resource (also called a finite resource) is a resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human time-frames. An example is carbon-based, organically-derived fuel. The original organic material, with the aid of heat and pressure, becomes a fuel such as oil or gas. Earth minerals and metal ores, fossil fuels (coal, petroleum, natural gas) and groundwater in certain aquifers are all considered non-renewable resources, though individual elements are almost always conserved.

In contrast, resources such as timber (when harvested sustainably) and wind (used to power energy conversion systems) are considered renewable resources, largely because their localized replenishment can occur within time frames meaningful to humans

Earth minerals and metal ore

Earth minerals and metal ores are examples of non-renewable resources. The metals themselves are present in vast amounts in Earth's crust, and their extraction by humans only occurs where they are concentrated by natural geological processes (such as heat, pressure, organic activity, weathering and other processes) enough to become economically viable to extract. These processes generally take from tens of thousands to millions of years, through plate tectonics, tectonic subsidence and crustal recycling.

The localized deposits of metal ores near the surface which can be extracted economically by humans are non-renewable in human time-frames. There are certain rare earth minerals and elements that are more

scarce and exhaustible than others. These are in high demand in manufacturing, particularly for the electronics industry.

Most metal ores are considered vastly greater in supply to fossil fuels, because metal ores are formed by crustal-scale processes which make up a much larger portion of the Earth's near-surface environment, than those that form fossil fuels which are limited to areas where carbon-based life forms flourish, die, and are quickly buried.

Fossil fuels

Natural resources such as coal, petroleum (crude oil) and natural gas take thousands of years to form naturally and cannot be replaced as fast as they are being consumed. Eventually it is considered that fossil-based resources will become too costly to harvest and humanity will need to shift its reliance to other sources of energy such as solar or wind power, see renewable energy.

An alternative hypothesis is that carbon based fuel is virtually inexhaustible in human terms, if one includes all sources of carbon-based energy such as methane hydrates on the sea floor, which are vastly greater than all other carbon based fossil fuel resources combined.^[1] These sources of carbon are also considered non-renewable, although their rate of formation/replenishment on the sea floor is not known. However their extraction at economically viable costs and rates has yet to be determined.

At present, the main energy source used by humans is non-renewable fossil fuels. Since the dawn of internal combustion engine technologies in the 19th century, petroleum and other fossil fuels have remained in continual demand. As a result, conventional infrastructure and transport systems, which are fitted to combustion engines, remain prominent throughout the globe. The continual use of fossil fuels at the current rate is believed to increase global warming and cause more severe climate change.^[2]

What is Air Pollution?

Pollution is now a common place term, that our ears are attuned to. We hear about the various forms of pollution and read about it through the mass media. Air pollution is one such form that refers to the contamination of the air, irrespective of indoors or outside. A physical, biological or chemical alteration to the air in the atmosphere can be termed as pollution. It occurs when any harmful gases, dust, smoke enters

into the atmosphere and makes it difficult for plants, animals and humans to survive as the air becomes dirty.

Air pollution can further be classified into two sections- Visible air pollution and invisible air pollution. Another way of looking at Air pollution could be any substance that holds the potential to hinder the atmosphere or the well being of the living beings surviving in it. The sustenance of all things living is due to a combination of gases that collectively form the atmosphere; the imbalance caused by the increase or decrease of The Ozone layer considered crucial for the existence of the ecosystems on the planet is depleting due to increased pollution. Global warming, a direct result of the increased imbalance of gases in the atmosphere has come to be known as the biggest threat and challenge that the contemporary world has to overcome in a bid for survival.

Types of Pollutants

In order to understand the causes of Air pollution, several divisions can be made. **Primarily air pollutants** can be caused by primary sources or secondary sources. The pollutants that are a direct result of the process can be called primary pollutants. A classic example of a primary pollutant would be the sulfur-dioxide emitted from factories

Secondary pollutants are the ones that are caused by the inter mingling and reactions of primary pollutants. Smog created by the interactions of several primary pollutants is known to be as secondary pollutant.

Causes of Air pollution

1. Burning of Fossil Fuels: Sulfur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles is one the major cause of air pollution. Pollution emitting from vehicles including trucks, jeeps, cars, trains, airplanes cause immense amount of pollution. We rely on them to fulfill our daily basic needs of transportation. But, there overuse is killing our environment as dangerous gases are polluting the environment. Carbon Monoxide caused by improper or incomplete combustion and generally emitted from vehicles is another major pollutant along with Nitrogen Oxides, that is produced from both natural and man made processes.

2. Agricultural activities: Ammonia is a very common by product from agriculture related activities and is one of the most hazardous gases in the atmosphere. Use of insecticides, pesticides and fertilizers in

agricultural activities has grown quite a lot. They emit harmful chemicals into the air and can also cause water pollution.

3. Exhaust from factories and industries: Manufacturing industries release large amount of carbon monoxide, hydrocarbons, organic compounds, and chemicals into the air thereby depleting the quality of air. Manufacturing industries can be found at every corner of the earth and there is no area that has not been affected by it. Petroleum refineries also release hydrocarbons and various other chemicals that pollute the air and also cause land pollution.

4. Mining operations: Mining is a process wherein minerals below the earth are extracted using large equipments. During the process dust and chemicals are released in the air causing massive air pollution. This is one of the reason which is responsible for the deteriorating health conditions of workers and nearby residents.

5. Indoor air pollution: Household cleaning products, painting supplies emit toxic chemicals in the air and cause air pollution. Have you ever noticed that once you paint walls of your house, it creates some sort of smell which makes it literally impossible for you to breathe.

Suspended particulate matter popular by its acronym SPM, is another cause of pollution. Referring to the particles afloat in the air, SPM is usually caused by dust, combustion etc.

Effects of Air pollution

1. Respiratory and heart problems: The effects of Air pollution are alarming. They are known to create several respiratory and heart conditions along with Cancer, among other threats to the body. Several millions are known to have died due to direct or indirect effects of Air pollution. Children in areas exposed to air pollutants are said to commonly suffer from pneumonia and asthma.

2. Global warming: Another direct effect is the immediate alterations that the world is witnessing due to Global warming. With increased temperatures world wide, increase in sea levels and melting of ice from colder regions and icebergs, displacement and loss of habitat have already signaled an impending disaster if actions for preservation and normalization aren't undertaken soon.

3. Acid Rain: Harmful gases like nitrogen oxides and sulfur oxides are released into the atmosphere during the burning of fossil fuels. When it rains, the water droplets combines with these air pollutants, becomes

acidic and then falls on the ground in the form of acid rain. Acid rain can cause great damage to human, animals and crops.

4. Eutrophication: Eutrophication is a condition where high amount of nitrogen present in some pollutants gets developed on sea's surface and turns itself into algae and adversely affect fish, plants and animal species. The green colored algae that is present on lakes and ponds is due to presence of this chemical only.

5. Effect on Wildlife: Just like humans, animals also face some devastating affects of air pollution. Toxic chemicals present in the air can force wildlife species to move to new place and change their habitat. The toxic pollutants deposit over the surface of the water and can also affect sea animal

Harmful Effects of Air Pollution

1. Air pollution affects respiratory system causing breathing difficulties and diseases such as bronchitis, asthma, lung cancer, tuberculosis and pneumonia.
2. It affects the central nervous system causing carbon monoxide poisoning. CO has more affinity for haemoglobin than oxygen and thus forms a stable compound carboxyhaemoglobin(COHb), which is poisonous and causes suffocation and death.
3. It causes depletion of ozone layer due to which ultraviolet radiations can reach the earth and cause skin cancer, damage to eyes and immune system.
4. It causes acid rain which damages crop plants, trees, buildings, monuments, statues and metal structures and also makes the soil acidic.
5. It causes greenhouse effect and global warming which leads to excessive heating of earth's atmosphere, further leading to weather variability and rise in sea level. The increased temperature may cause melting of ice caps and glaciers, resulting in floods.
6. Air pollution from certain metals, pesticides and fungicides causes serious ailments.
 - Lead pollution causes anaemia, brain damage, convulsions and death.
 - Certain metals cause problem in kidney, liver, circulatory system and nervous system.
 - Fungicides cause nerve damage and death.
 - Pesticides like DDT(Dichlorodiphenyltrichloroethane) which are toxic enter into our food chain and gets accumulated in the body causing kidney disorders and problems of brain and circulatory system.

Prevention And Control of Air Pollution

Different techniques are used for controlling air pollution caused by 'gaseous pollutants' and that caused by 'particulate pollutants'.

- **Methods of controlling gaseous pollutants**-The air pollution caused by gaseous pollutants like hydrocarbons, sulphur dioxide, ammonia, carbon monoxide, etc can be controlled by using three different methods-Combustion, Absorption and Adsorption.
 1. **Combustion**-This technique is applied when the pollutants are organic gases or vapours. The organic air pollutants are subjected to 'flame combustion or catalytic combustion' when they are converted to less harmful product carbon dioxide and a harmless product water.
 2. **Absorption**-In this method, the polluted air containing gaseous pollutants is passed through a scrubber containing a suitable liquid absorbent. The liquid absorbs the harmful gaseous pollutants present in air.
 3. **Adsorption**-In this method, the polluted air is passed through porous solid adsorbents kept in suitable containers. The gaseous pollutants are adsorbed at the surface of the porous solid and clean air passes through.
- **Methods of controlling particulate emissions**-The air pollution caused by particulate matter like dust, soot, ash, etc can be controlled by using fabric filters, wet scrubbers, electrostatic precipitators and certain mechanical devices.
 1. **Mechanical Devices**-It works on the basis of following:
 - **Gravity**-In this process, the particulate settle down by the action of gravitational force and get removed.
 - **Sudden change in the direction of air flow**-It brings about separation of particles due to greater momentum.
 2. **Fabric Filters**-The particulate matter is passed through a porous medium made of woven or filled fabrics.
 - The particulate present in the polluted air are filtered and gets collected in the fabric filters, while the gases are discharged.
 - The process of controlling air pollution by using fabric filters is called 'bag filtration'.
 3. **Wet Scrubbers**-They are used to trap SO_2 , NH_3 and metal fumes by passing the fumes through water.

4. **Electrostatic Precipitators**-When the polluted air containing particulate pollutants is passed through an electrostatic precipitator, it induces electric charge on the particles and then the aerosol particles get precipitated on the electrodes.

Some other methods of controlling Air Pollution:

1. Tall chimneys should be installed in factories.
2. Better designed equipment and smokeless fuels should be used in homes and industries.
3. Renewable and non-polluting sources of energy like solar energy, wind energy, etc should be used.
4. Automobiles should be properly maintained and adhere to emission control standards.
5. More trees should be planted along roadsides and houses.

Effective Methods to Control Air Pollution

Some of the effective methods to Control Air Pollution are as follows: (a) Source Correction Methods (b) Pollution Control equipment (c) Diffusion of pollutant in air (d) Vegetation (e) Zoning.

(a) Source Correction Methods:

Industries make a major contribution towards causing air pollution. Formation of pollutants can be prevented and their emission can be minimised at the source itself.

By carefully investigating the early stages of design and development in industrial processes e.g., those methods which have minimum air pollution potential can be selected to accomplish air-pollution control at source itself.

These source correction methods are:

(i) Substitution of raw materials:

If the use of a particular raw material results in air pollution, then it should be substituted by another purer grade raw material which reduces the formation of pollutants. Thus,

(a) Low sulphur fuel which has less pollution potential can be used as an alternative to high Sulphur fuels, and,

(b) Comparatively more refined liquid petroleum gas (LPG) or liquefied natural gas (LNG) can be used instead of traditional high contaminant fuels such as coal.

(ii) Process Modification:

The existing process may be changed by using modified techniques to control emission at source. For example,

- (a) If coal is washed before pulverization, then fly-ash emissions are considerably reduced.
- (b) If air intake of boiler furnace is adjusted, then excess Fly-ash emissions at power plants can be reduced.

(iii) Modification of Existing Equipment:

Air pollution can be considerably minimised by making suitable modifications in the existing equipment:

- (a) For example, smoke, carbon-monoxide and fumes can be reduced if open hearth furnaces are replaced with controlled basic oxygen furnaces or electric furnaces.
- (b) In petroleum refineries, loss of hydrocarbon vapours from storage tanks due to evaporation, temperature changes or displacement during filling etc. can be reduced by designing the storage tanks with floating roof covers.
- (c) Pressurising the storage tanks in the above case can also give similar results.

(iv) Maintenance of Equipment:

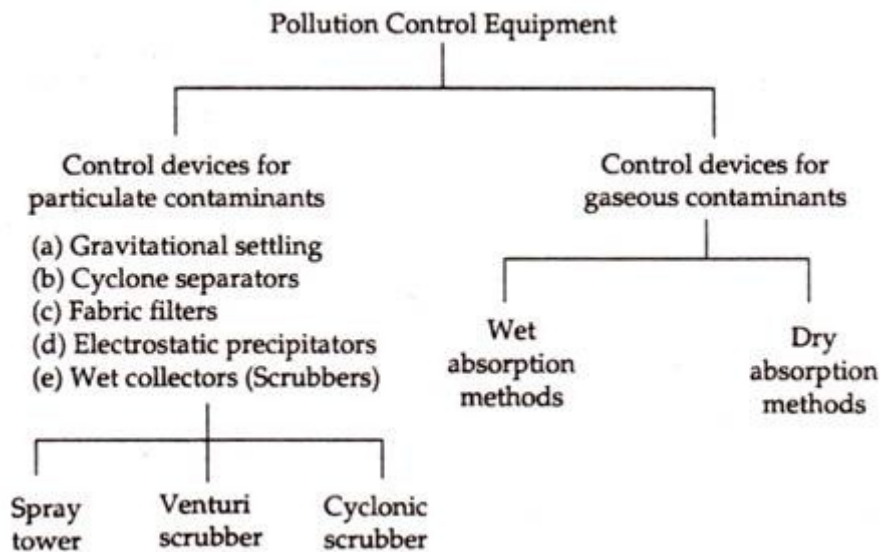
An appreciable amount of pollution is caused due to poor maintenance of the equipment which includes the leakage around ducts, pipes, valves and pumps etc. Emission of pollutants due to negligence can be minimised by a routine checkup of the seals and gaskets.

(b) Pollution Control Equipment:

Sometimes pollution control at source is not possible by preventing the emission of pollutants. Then it becomes necessary to install pollution control equipment to remove the gaseous pollutants from the main gas stream. The pollutants are present in high concentration at the source and as their distance from the source increases they become diluted by diffusing with environmental air.

Pollution control equipment's are generally classified into two types:

- (a) Control devices for particulate contaminants.
- (b) Control devices for gaseous contaminants.



In the present book only the control devices for particulate contaminants are dealt with.

Control Devices for Particulate Contaminants:

(1) *Gravitational Settling Chamber:*

For removal of particles exceeding 50 μm in size from polluted gas streams, gravitational settling chambers are put to use.

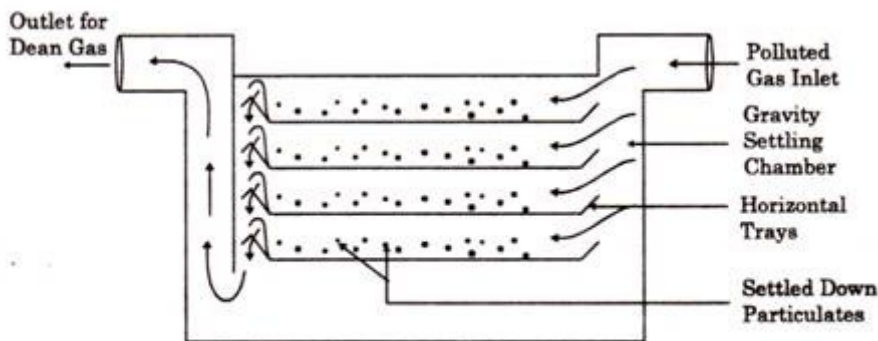


Fig. 5.1 Gravitational Settling Chamber

This device consists of huge rectangular chambers. The gas stream polluted with particulates is allowed to enter from one end. The horizontal velocity of the gas stream is kept low (less than 0.3 m/s) in order to give sufficient time for the particles to settle by gravity.

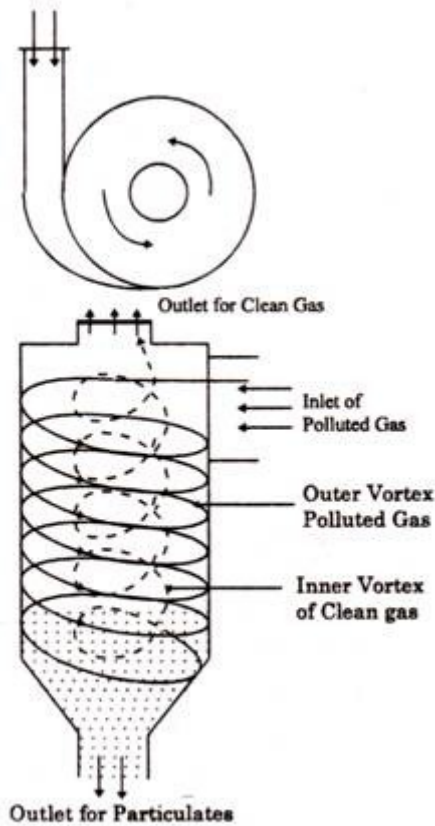
The particulates having higher density obey Stoke's law and settle at the bottom of the chamber from where they are removed ultimately. The several horizontal shelves or trays improve the collection efficiency by shortening the settling path of the particles.

(2) *Cyclone Separators (Reverse flow Cyclone):*

Instead of gravitational force, centrifugal force is utilized by cyclone separators, to separate the particulate matter from the polluted gas. Centrifugal force, several times greater than gravitational force, can be

generated by a spinning gas stream and this quality makes cyclone separators more effective in removing much smaller particulates than can possibly be removed by gravitational settling chambers.

A simple cyclone separator (Fig 5.2) consists of a cylinder with a conical base. A tangential inlet discharging near the top and an outlet for discharging the particulates is present at the base of the cone.



**Fig. 5.2. Cyclone Separator
(Reverse Flow Cyclone)**

Mechanism of Action:

The dust laden gas enters tangentially, receives a rotating motion and generates a centrifugal force due to which the particulates are thrown to the cyclone walls as the gas spirals upwards inside the cone (i.e. flow reverses to form an inner vortex which leaves flow through the outlet). The particulates slide down the walls of the cone and are discharged from the outlet.

(3) Fabric Filters (Baghouse Filters):

In a fabric filter system, a stream of the polluted gas is made to pass through a fabric that filters out the particulate pollutant and allows the clear gas to pass through. The particulate matter is left in the form of a thin dust mat on the insides of the bag. This dust mat acts as a filtering medium for further removal of particulates increasing the efficiency of the filter bag to sieve more sub micron particles ($0.5\ \mu\text{m}$).

A typical filter (Fig 5.3) is a tubular bag which is closed at the upper end and has a hopper attached at the lower end to collect the particles when they are dislodged from the fabric. Many such bags are hung in a

baghouse. For efficient filtration and a longer life the filter bags must be cleaned occasionally by a mechanical shaker to prevent too many particulate layers from building up on the inside surfaces of the bag.

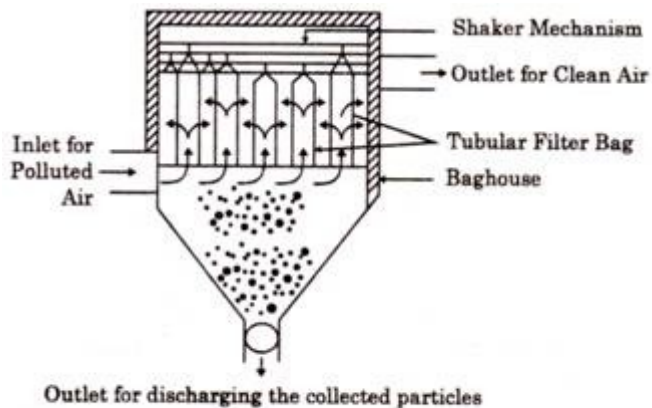


Fig. 5.3 Fabric Filter (Baghouse Filter)

(4) Electrostatic Precipitators:

The electrostatic precipitator (Fig. 5.4) works on the principle of electrostatic precipitation i.e. electrically charged particulates present in the polluted gas are separated from the gas stream under the influence of the electrical field.

A typical wire and pipe precipitator consists of:

- (a) A positively charged collecting surface (grounded).
- (b) A high voltage (50 KV) discharge electrode wire.
- (c) Insulator to suspend the electrode wire from the top.
- (d) A weight at the bottom of the electrode wire to keep the wire in position.

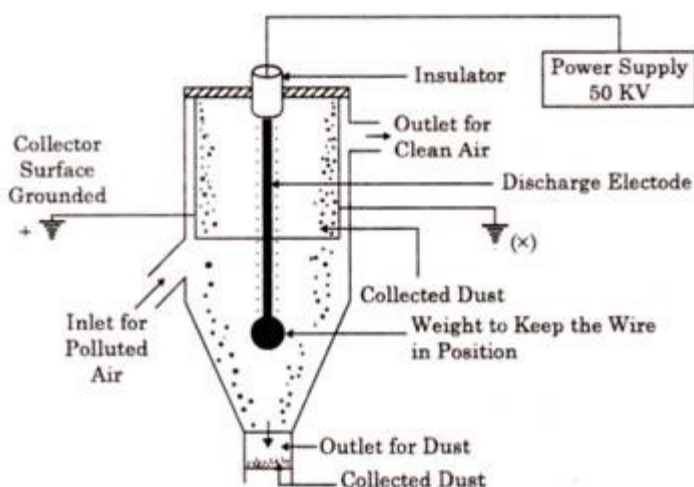


Fig. 5.4 Electrostatic Precipitator

Mechanism of Action:

The polluted gas enters from the bottom, flows upwards (i.e. between the high voltage wire and grounded collecting surface). The high voltage in the wire ionises the gas. The negative ions migrate towards the grounded surface and pass on their negative charge to the dust particles also. Then these negatively charged dust particles are electrostatically drawn towards the positively charged collector surface, where they finally get deposited.

The collecting surface is rapped or vibrated to periodically remove the collected dust-particles so that the thickness of the dust layer deposited does not exceed 6 mm, otherwise the electrical attraction becomes weak and efficiency of the electrostatic precipitator gets reduced.

As the electrostatic precipitation has 99 + percent efficiency and can be operated at high temperatures (600°C) and pressure at less power requirement, therefore, it is economical and simple to operate compared to other devices.

(5) Wet Collectors (Scrubbers):

In wet collectors or scrubbers, the particulate contaminants are removed from the polluted gas stream by incorporating the particulates into liquid droplets.

Common wet scrubbers are:

(i) Spray Tower

(ii) Venturi Scrubber

(iii) Cyclone Scrubber

(i) Spray Tower:

Water is introduced into a spray tower by means of a spray nozzle (i.e. there is downward flow of water). As the polluted gas flows upwards, the particulates (size exceeding 10 μm) present collide with the water droplets being sprayed downward from the spray nozzles. Under the influence of gravitational force, the liquid droplets containing the particulates settle to the bottom of the spray tower.

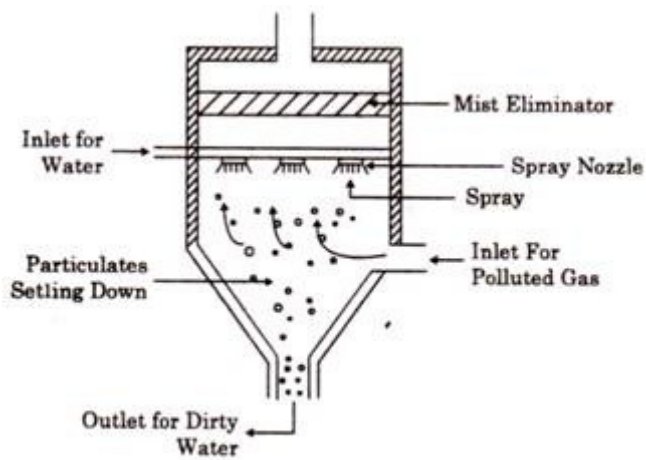


Fig. 5.5. Spray Tower

(ii) Venturi Scrubber:

Submicron particulates (size 0.5 to 5 μm) associated with smoke and fumes are very effectively removed by the highly efficient Venturi Scrubbers. As shown in Fig 5.6 a Venturi Scrubber has a Venturi shaped throat section. The polluted gas passes downwards through the throat at the velocity of 60 to 180 m/sec.

A coarse water stream is injected upwards into the throat where it gets atomised (i.e. breaks the water into droplets) due to the impact of high velocity of the gas. The liquid droplets collide with the particulates in the polluted gas stream.

The particles get entrained in the droplets and fall down to be removed later on. Venturi Scrubbers can also remove soluble gaseous contaminants. Due to the atomisation of water there is proper contact between the liquid and the gas increasing the efficiency of the Venturi Scrubber (their power cost is high because of the high inlet gas velocity).

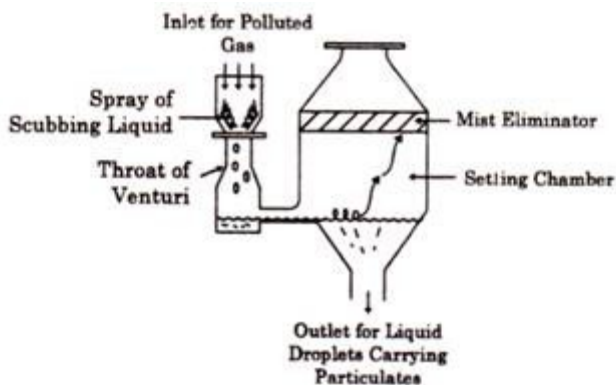


Fig. 5.6. Venturi Scrubber Connected to a Cyclone Separator

To separate the droplets carrying the particulate matter from the gas stream, this gas-liquid mixture in the Venturi Scrubber is then directed into a separation device such as a cyclone separator.

(iii) Cyclone Scrubber:

The dry cyclone chamber can be converted into a wet cyclone scrubber by inserting high pressure spray nozzles at various places within the dry chamber

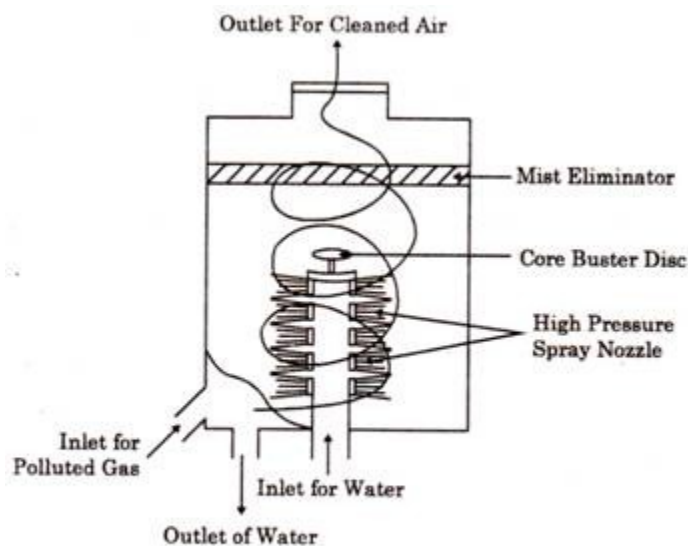


Fig. 5.7. Cyclone Scrubber

The high pressure spray nozzles generate a fine spray that intercepts the small particles in the polluted gas. The centrifugal force throws these particles towards the wall from where they are drained downwards to the bottom of the scrubber.

(c) Diffusion of Pollutants in Air:

Dilution of the contaminants in the atmosphere is another approach to the control of air pollution. If the pollution source releases only a small quantity of the contaminants then pollution is not noticeable as these pollutants easily diffuse into the atmosphere but if the quantity of air contaminants is beyond the limited capacity of the environment to absorb the contaminants then pollution is caused.

However, dilution of the contaminants in the atmosphere can be accomplished through the use of tall stacks which penetrate the upper atmospheric layers and disperse the contaminants so that the ground level pollution is greatly reduced. The height of the stacks is usually kept 2 to $2\frac{1}{2}$ times the height of nearby structures.

Dilution of pollutants in air depend on atmospheric temperature, speed and direction of the wind. The disadvantage of the method is that it is a short term contact measure which in reality brings about highly undesirable long range effects.

This is so because dilution only dilutes the contaminants to levels at which their harmful effects are less noticeable near their original source whereas at a considerable distance from the source these very contaminants eventually come down in some form or another.

(d) Vegetation:

Plants contribute towards controlling air-pollution by utilizing carbon dioxide and releasing oxygen in the process of photosynthesis. This purifies the air (removal of gaseous pollutant—CO₂) for the respiration of men and animals.

Gaseous pollutants like carbon monoxide are fixed by some plants, namely, *Coleus Blumeri*, *Ficus variegata* and *Phascolus Vulgaris*. Species of *Pinus*, *Quercus*, *Pyrus*, *Juniperus* and *Vitis* depollute the air by metabolising nitrogen oxides. Plenty of trees should be planted especially around those areas which are declared as high-risk areas of pollution.

(e) Zoning:

This method of controlling air pollution can be adopted at the planning stages of the city. Zoning advocates setting aside of separate areas for industries so that they are far removed from the residential areas. The heavy industries should not be located too close to each other.

New industries, as far as possible, should be established away from larger cities (this will also keep a check on increasing concentration of urban population in a few larger cities only) and the locational decisions of large industries should be guided by regional planning. The industrial estate of Bangalore is divided into three zones namely light, medium and large industries. In Bangalore and Delhi very large industries are not permitted.

Water pollution

Water they say is life, and indeed they were right. With about 70% of the earth's cover being water, it undeniably becomes one of our greatest resources. As young students, we learned about the various ways to conserve water; coming to think of it, water is used in almost every important human chores and processes. It is an important element in both domestic as well as industrial purposes. However a closer inspection of our water resources today, give us a rude shock.

Infested with waste ranging from floating plastic bags to chemical waste, our water bodies have turned into a pool of poison. The contamination of water bodies in simplest words means water pollution. Thereby the abuse of lakes, ponds, oceans, rivers, reservoirs etc is water pollution. Pollution of water occurs when substances that will modify the water in negative fashion are discharged in it. This discharge of pollutants can be direct as well as indirect.

Water pollution is an appalling problem, powerful enough to lead the world on a path of destruction. Water is an easy solvent, enabling most pollutants to dissolve in it easily and contaminate it. The most basic effect of water pollution is directly suffered by the organisms and vegetation that survive in water, including amphibians. On a human level, several people die each day due to consumption of polluted and infected water.

Sources of Water Pollution

There are various classifications of water pollution. The two chief sources of water pollution can be seen as **Point and Non Point**.

Point refer to the pollutants that belong to a single source. An example of this would be emissions from factories into the water.

Non Point on the other hand means pollutants emitted from multiple sources. Contaminated water after rains that has traveled through several regions may also be considered as a Non point source of pollution.

Causes of Water Pollution

Let us now study the causes of water pollution.

1. Industrial waste: Industries produce huge amount of waste which contains toxic chemicals and pollutants which can cause air pollution and damage to us and our environment. They contain pollutants such as lead, mercury, sulphur, asbestos, nitrates and many other harmful chemicals. Many industries do not have proper waste management system and drain the waste in the fresh water which goes into rivers, canals and later in to sea. The toxic chemicals have the capability to change the color of water, increase the amount of minerals, also known as Eutrophication, change the temperature of water and pose serious hazard to water organisms.

2. Sewage and waste water: The sewage and waste water that is produced by each household is chemically treated and released in to sea with fresh water. The sewage water carries harmful bacteria and chemicals that can cause serious health problems. Pathogens are known as a common water pollutant; The sewers of cities house several pathogens and thereby diseases. Microorganisms in water are known to be causes of some very deadly diseases and become the breeding grounds for other creatures that act like carriers. These carriers inflict these diseases via various forms of contact onto an individual. A very common example of this process would be Malaria.

3. Mining activities: Mining is the process of crushing the rock and extracting coal and other minerals from underground. These elements when extracted in the raw form contains harmful chemicals and can increase the amount of toxic elements when mixed up with water which may result in health problems. Mining activities emit several metal waste and sulphides from the rocks and is harmful for the water.

4. Marine dumping: The garbage produce by each household in the form of paper, aluminum, rubber, glass, plastic, food if collected and deposited into the sea in some countries. These items take from 2 weeks to 200 years to decompose. When such items enters the sea, they not only cause water pollution but also harm animals in the sea.

5. Accidental Oil leakage: Oil spill pose a huge concern as large amount of oil enters into the sea and does not dissolve with water; there by opens problem for local marine wildlife such as fish, birds and sea otters. For e.g.: a ship carrying large quantity of oil may spill oil if met with an accident and can cause varying damage to species in the ocean depending on the quantity of oil spill, size of ocean, toxicity of pollutant.

6. Burning of fossil fuels: Fossil fuels like coal and oil when burnt produce substantial amount of ash in the atmosphere. The particles which contain toxic chemicals when mixed with water vapor result in acid rain. Also, carbon dioxide is released from burning of fossil fuels which result in global warming.

7. Chemical fertilizers and pesticides: Chemical fertilizers and pesticides are used by farmers to protect crops from insects and bacterias. They are useful for the plants growth. However, when these chemicals are mixed up with water produce harmful for plants and animals. Also, when it rains, the chemicals mixes up with rainwater and flow down into rivers and canals which pose serious damages for aquatic a8. **Leakage from sewer lines:** A small leakage from the sewer lines can contaminate the underground water and make it unfit for the people to drink. Also, when not repaired on time, the leaking water can come on to the surface and become a breeding ground for insects and mosquitoes.

9. Global warming: An increase in earth's temperature due to greenhouse effect results in global warming. It increases the water temperature and result in death of aquatic animals and marine species which later results in water pollution.

10. Radioactive waste: Nuclear energy is produced using nuclear fission or fusion. The element that is used in production of nuclear energy is Uranium which is highly toxic chemical. The nuclear waste that is produced by radioactive material needs to be disposed off to prevent any nuclear accident. Nuclear waste can have serious environmental hazards if not disposed off properly. Few major accidents have already taken place in Russia and Japan.

11. Urban development: As population has grown, so has the demand for housing, food and cloth. As more cities and towns are developed, they have resulted in increase use of fertilizers to produce more food, soil erosion due to deforestation, increase in construction activities, inadequate sewer collection and treatment, landfills as more garbage is produced, increase in chemicals from industries to produce more materials.

12. Leakage from the landfills: Landfills are nothing but huge pile of garbage that produces awful smell and can be seen across the city. When it rains, the landfills may leak and the leaking landfills can pollute the underground water with large variety of contaminants.

13. Animal waste: The waste produce produce by animals is washed away into the rivers when it rains. It gets mixed up with other harmful chemicals and causes various water borne diseases like cholera, diarrhea, jaundice, dysentery and typhoid.

14. Underground storage leakage: Transportation of coal and other petroleum products through underground pipes is well known. Accidentals leakage may happen anytime and may cause damage to environment and result in soil erosion.

Water pollutants also include both organic and inorganic factors. Organic factors include volatile organic compounds, fuels, waste from trees, plants etc. Inorganic factors include ammonia, chemical waste from factories, discarded cosmetics etc. The water that travels via fields is usually contaminated with all forms of waste inclusive of fertilizers that it swept along the way. This infected water makes its way to our water bodies and sometimes to the seas endangering the flora, fauna and humans that use it along its path.

The current scenario has led to a consciousness about water preservation and efforts are being made on several levels to redeem our water resources. Industries and factory set-up's are restricted from contaminating the water bodies and are advised to treat their contaminated waste through filtration methods. People are investing in rain water harvesting projects to collect rainwater and preserve it in wells below ground level.

Water Pollution is common, and is an area of high alert. Water needs to be preserved and respected today, for us to live a tomorrow.

What is Dissolved Oxygen?

Dissolved oxygen refers to the level of free, non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the organisms living within a body of water. In limnology (the study of lakes), dissolved oxygen is an essential factor second only to water itself ¹. A dissolved oxygen level that is too high or too low can harm aquatic life and affect water quality.

Non-compound oxygen, or free oxygen (O₂), is oxygen that is not bonded to any other element. Dissolved oxygen is the presence of these free O₂ molecules within water. The bonded oxygen molecule in water (H₂O) is in a compound and does not count toward dissolved oxygen levels. One can imagine that free oxygen molecules dissolve in water much the way salt or sugar does when it is stirred ².

Prevention of Water Pollution

Here are the top 14 ways to Prevent Water Pollution.

1. Sewage treatments: The household water should be treated properly so that they become environmentally safe. Adequate care should be taken to ensure that effective sewage treatment process is in place and that contaminated water does not get mixed with the environment. In order to prevent water pollution, human and animal excreta should be prevented from mixing with its sources. Construction of pit toilet and proper sewage treatments can offer some solution to this problem.

2. Prevent river water to get polluted: The flowing water of the river cannot be cleaned easily by natural process. Since, a large number of external substances are discharged into the water, the river water becomes polluted. This may cause diseases to the people using river water. Thus, every effort should be made to prevent the river water to get contaminated. People should not be allowed to throw wastes into the river water. Further, effective urban runoff (discharge of polluted storm water into river) mitigation system such as retention basins, infiltration basins, etc. should be in place.

3. Treatment of wastes before discharge: Factories are expected to treat its effluent wastes prior to discharge. Toxic material must be treated chemically and converted into harmless materials. If possible, factories should try to recycle the treated water.

4. Strict adherence to water laws: Laws and legislation relating to pollution should be strictly followed by all. People should be made aware that adherence to water laws are in their own interest.

5. Treatment of drainage water: In cities, a huge amount of water is put into drains every day. The water that flows through the city drainage system should be properly treated. Harmful pollutants be removed, before they are introduced into reservoirs. If this water allowed going into water reservoirs without treatment, it will pollute them.

6. Treatment plants: Big cities and towns usually have effluent treatment plants. These plants filter out undissolved materials. Chemical treatment is also given to separate out unwanted dissolved chemicals. The treated water is either allowed to go into the water reservoirs or reused in houses. Occasionally, the treated water is used for farming if the fields to be irrigated lie in the vicinity of the water treatment plants.

7. Keep the pond water clean and safe: Washing, bathing of cattle in the pond that is used by human should not be done. Washing of dirty clothes and bathing of cattle make the pond water dirty and unsuitable for human use. If these ponds are continually misused, then it may lead to severe consequences.

8. Routine cleaning: Ponds, lakes and wells meant for human use should be routinely cleaned and treated, so that it remains fit for human use. It is an essential step that should not be avoided. A system of regular testing of pond and lake water can be introduced to ensure the safety of the water.

9. Don't pour insecticides in sinks and toilets: Never pour household insecticides, medicines, etc. down the sink, drain or toilet. At homes, people often throw wastes and old medicines into the bathroom toilet. This practice is discouraged for the reason that the chemical compounds of medicines, insecticides, etc., when mixed with other chemicals, may result in formation of harmful substances.

10. Self hygiene: Self hygiene must be maintained and drinking water must not be polluted. Drinking water should be kept under cover in a clean place. One should not put his hands into the drinking water containers. Also, the practice of cleaning the drinking water reservoirs on a regular basis need to be strictly followed. The water meant for drinking should be purified prior to use. In the absence of good water purifier, it is recommended to drink boiled water. This is also important to prevent water borne diseases.

11. Sanitation: Sanitation system must be improved. The benefits of cleanliness on human health need to be understood. Human contact with hazardous materials should be prevented. After using the toilet, one should always use the flush and wash their hands with soap and water.

12. Public Awareness: Common public should be aware about the effect of water pollution. Voluntary organization should go door-to-door to educate the people about environmental problems. They should

perform street plays for creating awareness about the environment. They should run environmental education centers. Students can impart health education to enable people to prevent water pollution.

13. Reduce the use of water as coolant by large industries and power plants: Massive quantity of water is being used as coolant by industries and power plants. Very often, these water are discharged in water bodies without prior treatment. Very often unnaturally hot or cool water is released into the natural water bodies. This causes sudden change in the temperature of the water is known as “thermal shock”, and it disturbs the water inhabitants badly. The water ecosystem can be saved from thermal pollution, if the water used as coolant is reused by the industries and not discharged into these natural water bodies.

14. Effective waste water management system: The municipalities of most urban cities should have robust waste water management system to minimize the risk of urban pollutants being introduced into the rivers. Tests should be in place to check the proper functioning of these system.

WHAT IS SOIL POLLUTION?

Any undesirable change in the physical, chemical or biological properties of the soil, which is harmful to environment, living organisms and plants, is called ‘soil pollution’. It adversely affects human nutrition and crop production and productivity, and the quality and utility of soil. Cadmium, chromium, copper, pesticide, chemical fertilizer, weed, toxic gases etc. are major soil pollutants. For example, if pesticides are used while farming, then it affects the plants and the soil apart from killing the insects.

THE PROBLEM OF SOIL POLLUTION

The problem of soil pollution arises due to mixing of toxic and polluted materials in the soil. Illegal dumping is the biggest reason for soil pollution, which adversely affects the quality of soil and the health of people living on it. Soil pollution also spreads through polluted water absorbed by the soil. Chemical compost used in agricultural work, litter and dirt also badly pollute the soil. The soil is also polluted by the mineral oil spread on the land accidentally. Pollutants present in the air also contribute to polluting the soil. Through the rain water, pollutants present in the air descend on the ground which ultimately results into polluting the soil.

Soil is an important natural resource on Earth that is essential to run the life of humankind and animals by producing vegetation, grains and other natural substances required for food and living.

Fertile soil on Earth is essential for the production of crops which is essential for the food of all living beings. Fertility of the land is severely affected due to the inclusion of toxic elements in the soil due to chemical fertilizers, pesticides,

TYPES OF SOIL POLLUTION

There are many types of natural and human-born soil pollution:

Land pollution from domestic and industrial solid waste

Electronic goods, broken furniture, junk papers, polythene bags, plastic cans, bottles, wastewater, toxic waste from the hospital etc. are examples of solid waste which pollute the soil. Most of this litter is non biodegradable. These wastes affect the soil structure by being blocked in it for long periods. Because these solid wastes do not decay easily, they lie on landfill sites for thousands of years and keep polluting the soil and the environment continuously. In addition to the soil, humans and animals living around these landfill sites are greatly harmed.

Household waste, industrial waste etc. contain residues of harmful toxic inorganic and organic chemicals. In these residues, radiation elements such as strontium, cadmium, uranium, radon are found, which affect the vitality and fertility of the land. Fly ash is a major source of pollution surrounding the industrial area.

There are chemicals or other types of waste in industries, which are dumped at some place. So much so that soil becomes polluted and trees and plants do not even grow in such a part.

Soil pollution by chemical substances

The use of chemical pesticides and fertilizers has increased for cultivating more crops and these pollutants are making the soil poisonous and in many places the soil has become dead due to excessive use of it.

Producers of fertilizers, insecticides, pesticides, pharmaceuticals produce a lot of solid and liquid waste. Due to leaks from pipes and gutters, pollutants also go into the soil and spread pollution.

In the chemical and nuclear power plants, a large amount of waste is released continuously and due to the absence of proper arrangements for their storage and disposal, these substances pollute the soil.

In commercial agriculture, insecticides are being used indiscriminately and inorganic chemical fertilizers are also being used day by day. The chemical fertilizers are polluting the environment and groundwater

resources of phosphate, nitrogen and other organic chemical land. The most dangerous pollutants are bioactive chemicals, due to which the micro-organisms of climates and other soil are being destroyed resulting in decreased quality of soil. Toxic chemicals enter the diet chain, so that they reach the top consumer. Bioactive chemicals are also called Creeping Deaths. In the last 30 years, the use of organic chemicals has increased by more than 11 times. India alone is using 100,000 tonnes of bio-chemicals per annum.

Continuous deforestation

Trees absorb carbon dioxide from the air; provide oxygen for humans and other organisms. Apart from these, tree plantations are also helpful in prevention of soil pollution and erosion. Tree plantation rejuvenates the lost potency of soil. But unfortunately, we are continuously cutting trees on the millions of acres of land for the wood required for construction and the land required for the cultivation, besides mining work.

Agricultural Pollution

Many different agricultural processes contribute to soil pollution, which occurs both on the site itself and in nearby areas. Chemical fertilizers provide extra nutrients to increase crop yield, but also cause pollution that negatively impacts crops and soil quality over time. Pesticides kill insects that impact crop growth, but also harm animals and plants by contaminating the soil. Eventually, these chemicals seep into the soil and poison groundwater supplies. Rain and irrigation may also cause runoff that directs these chemicals to local waterways, or deposits them in the soil at other locations.

According to the Indian Government's Department of Education, agricultural pollution decreases soil fertility, increases erosion and kills flora and fauna. It creates an imbalance in the soil that may prevent future farming in the area. The University of Minnesota recommends bio-fertilizers to enhance crop yield without contributing to soil pollution.

Urban Activities

Many everyday human activities lead to soil pollution, both directly and indirectly. Paving and development prevent proper drainage and increase runoff, which spreads construction-related contaminants to nearby land areas or streams. Increased waste disposal contaminates both landfills and public spaces. Trash that is improperly disposed of eventually breaks down into the soil, where it deposits any number of chemicals and pollutants into the earth. These pollutants may seep into groundwater or wash away into local waterways during a storm.

Excess waste, regardless of where it is disposed of, increases the presence of bacteria in the soil. As these

bacteria break down organic waste products, they generate methane gas that contributes to global warming and poor air quality. Decomposition of waste in the soil also creates foul odors that can impact quality of life.

Recycling offers an effective method of reducing waste and limiting soil pollution from urban activities.

Industrial Waste

According to the Indian Government Department of Education, 90 percent of soil pollution is caused by industrial waste products, while much of the remaining 10 percent comes from dry cleaning and gas station waste. When this waste is improperly disposed of, it contaminates the soil with harmful chemicals. These pollutants impact plant and animal species and eventually reach local water supplies, where they contaminate drinking water. Even when this waste is sent to regulated landfills, it releases toxic fumes that may harm nearby residents. These fumes also contain chemicals that can fall back to earth in the form of acid rain, which may damage soil and other objects across the entire region.

Bioremediation is one method of removing industrial pollution from the soil, according to the University of Massachusetts. This technique requires cleanup crews to introduce healthy bacteria into the soil, where they gradually break down harmful materials and restore the balance of the soil.

What is Solid Waste Management?

Solid waste management is a term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage or trash. As long as people have been living in settlements and residential areas, garbage or solid waste has been an issue. Waste management is all about how solid waste can be changed and used as a valuable resource. Solid waste management should be embraced by each and every household including the business owners across the world. Industrialization has brought a lot of good things and bad things as well. One of the negative effects of industrialization is the creation of solid waste.

According to Britannica, “*Solid-waste management, the collecting, treating, and disposing of solid material that is discarded because it has served its purpose or is no longer useful. Improper disposal of municipal solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease—that is, diseases spread by rodents and insects.*”

Noise Pollution

Most of us are very used to the sounds we hear in everyday life. Loud music, the television, people talking on their phone, the traffic and even pets barking in the middle of the night. All of these have become a part of the urban culture and rarely disturb us. However, when the sound of the television keeps you from sleeping all night or the traffic starts to give you a headache, it stops becoming just noise and start turning into noise pollution. For many of us, the concept of pollution is limited to nature and resources. However, noise that tends to disrupt the natural rhythm of life makes for one solid pollutant.

By definition, noise pollution takes place when there is either excessive amount of noise or an unpleasant sound that causes temporary disruption in the natural balance. This definition is usually applicable to sounds or noises that are unnatural in either their volume or their production. Our environment is such that it has become difficult to escape noise. Even electrical appliances at home have a constant hum or beeping sound. By and large, lack of urban planning increases the exposure to unwanted sounds. This is why understanding noise pollution is necessary to curb it in time.

Causes of Noise Pollution

1. Industrialization: Most of the industries use big machines which are capable of producing large amount of noise. Apart from that, various equipments like compressors, generators, exhaust fans, grinding mills also participate in producing big noise. Therefore, you must have seen workers in these factories and industries wearing ear plugs to minimize the effect of noise.

2. Poor Urban Planning: In most of the developing countries, poor urban planning also play a vital role. Congested houses, large families sharing small space, fight over parking, frequent fights over basic amenities leads to noise pollution which may disrupt the environment of society.

3. Social Events: Noise is at its peak in most of the social events. Whether it is marriage, parties, pub, disc or place of worship, people normally flout rules set by the local administration and create nuisance in the area. People play songs on full volume and dance till midnight which makes the condition of people living nearby pretty worse. In markets, you can see people selling clothes via making loud noise to attract the attention of people.

4. Transportation: Large number of vehicles on roads, aeroplanes flying over houses, underground trains produce heavy noise and people get it difficult to get accustomed to that. The high noise leads to a situation wherein a normal person lose the ability to hear properly.

5. Construction Activities: Under construction activities like mining, construction of bridges, dams, buildings, stations, roads, flyovers take place in almost every part of the world. These construction activities take place everyday as we need more buildings, bridges to accommodate more people and to reduce traffic congestion. The down point is that these construction equipments are too noisy.

6. Household Chores: We people are surrounded by gadgets and use them extensively in our daily life. Gadgets like TV, mobile , mixer grinder, pressure cooker, vacuum cleaners , washing machine and dryer, cooler, air conditioners are minor contributors to the amount of noise that is produced but it affects the quality of life of your neighborhood in a bad way.

While this form of pollution may seem harmless, it in fact has far reaching consequences. The adverse effects on the health of the environment are quite severe. Not only is the local wildlife affected by the pollution, humans also face a number of problems due to it.

Effects of Noise Pollution

1. Hearing Problems: Any unwanted sound that our ears have not been built to filter can cause problems within the body. Our ears can take in a certain range of sounds without getting damaged. Man made noises such as jackhammers, horns, machinery, airplanes and even vehicles can be too loud for our hearing range. Constant exposure to loud levels of noise can easily result in the damage of our ear drums and loss of hearing. It also reduces our sensitivity to sounds that our ears pick up unconsciously to regulate our body's rhythm.

2. Health Issues: Excessive noise pollution in working areas such as offices, construction sites, bars and even in our homes can influence psychological health. Studies show that the occurrence of aggressive behavior, disturbance of sleep, constant stress, fatigue and hypertension can be linked to excessive noise levels. These in turn can cause more severe and chronic health issues later in life.

3. Sleeping Disorders: Loud noise can certainly hamper your sleeping pattern and may lead to irritation and uncomfortable situations. Without a good night sleep, it may lead to problems related to fatigue and your performance may go down in office as well as at home. It is therefore recommended to take a sound sleep to give your body proper rest.

4. Cardiovascular Issues: Blood pressure levels, cardio-vascular disease and stress related heart problems are on the rise. Studies suggest that high intensity noise causes high blood pressure and increases heart beat rate as it disrupts the normal blood flow. Bringing them to a manageable level depends on our understanding noise pollution and how we tackle it.

5. Trouble Communicating: High decibel noise can put trouble and may not allow two people to communicate freely. This may lead to misunderstanding and you may get difficult understanding the other person. Constant sharp noise can give you severe headache and disturb your emotional balance.

6. Effect on Wildlife: Wildlife faces far more problems than humans because noise pollution since they are more dependent on sound. Animals develop a better sense of hearing than us since their survival depends on it. The ill effects of excessive noise begin at home. Pets react more aggressively in households where there is constant noise.

They become disoriented more easily and face many behavioral problems. In nature, animals may suffer from hearing loss, which makes them easy prey and leads to dwindling populations. Others become inefficient at hunting, disturbing the balance of the eco-system.

Species that depend on mating calls to reproduce are often unable to hear these calls due to excessive man made noise. As a result, they are unable to reproduce and cause declining populations. Others require sound waves to echo-locate and find their way when migrating. Disturbing their sound signals means they get lost easily and do not migrate when they should. To cope up with the increasing sound around them, animals are becoming louder, which may further add to the pollution levels. This is why understanding noise pollution can help us lower the impact it has on the environment.

As of now, there do not exist many solutions to reduce sound pollution. On a personal level, everybody can help reducing the noise in their homes by lowering the volume of the radio, music system and the television. Listening to music without headphones is also a good step forward. Removal of public loudspeakers is another way in which the pollution can be countered.

As is controlling the sound levels in clubs, bars, parties and discos. Better urban planning can help in creating ‘No-Noise’ zones, where honking and industrial noise are not tolerated. It is only when our understanding noise pollution is complete, can we take steps to eradicate it completely.

Ways to Reduce Noise Pollution

1. **Close the windows.** By simply closing the windows, we can reduce the amount of noise entering into our homes and buildings. It keeps away unwanted sound. The best thing to do is to only open windows during the quieter times of the day, most probably late in the evenings.
2. **Put on earplugs.** Wearing earplugs is a cost-effective solution of reducing noise pollution. A pair of earplugs can be worn while sleeping or at any other time of the day when you want to reduce the amount of noise hitting your eardrums. Earplugs have their health benefits especially for those who want to have a healthy sleeping habit in noisy areas.
3. **Improve your insulation.** Insulation measures are some of the basic and most practical ways to reduce noise pollution at home. It's an art of soundproofing which helps in blocking the sound vibrations and noise. By improving insulation it means installing soundproofing materials on the walls, ceiling and even on the floor. The use of double-pane windows can also aid in absorbing noise.
4. **Invest in noise-canceling headphones.** Majority of people may not realize this, but sound-cancelling headphones are good for reducing noise pollution. It's essentially important for industrial and construction workers. The noise cancelling headphones filters the unwanted noise before it reaches the ears.
5. **Do wall-to-wall carpeting.** Wall-to-wall carpeting comes in as another simple and practical way of reducing noise pollution. Such an undertaking goes a long way in reducing incoming noise into our homes or offices.
6. **Install a fence.** This may sound extreme, but it qualifies as a practical way to reduce noise pollution. Noise is produced by strong sound waves or vibrations which can be significantly reduced by barriers. By installing a fence, you'll be creating a barrier that absorbs the strong sound waves or vibrations thereby reducing noise pollution around your office or home.
7. **Be creative with the office or house layout.** One way to reduce noise in the house or in an office setting is getting innovative with the general layout. For instance, noisy machines can be situated in areas that are not close to the sitting/resting or working areas.

8. **Invest in noise friendly flooring.** Floors can offer impressive ways of reducing noise pollution. However, it depends on the type of floor in place. Carpeting for instance usually reduces substantial amount of noise but better results can be achieved by use of noise friendly flooring like vinyl. Vinyl is a resourceful alternative to carpeting and delivers better in reducing noise pollution because of its sound absorption qualities.
9. **Invest in sound friendly furniture.** Furniture are great sound absorbers as they reduce echo and sound vibrations. Therefore, sound friendly lounge chairs, bookshelves, couches and cabinets can have an effect on the acoustics of open spaces. For instance, in case of a noisy neighbor, put a big bookshelf against the wall to reduce the noise coming from their house or building.
10. **Use of modern acoustic wall panels.** Not all wall panels incredibly serve well at reducing noise pollution. Because of technological advancements, there are modern designs acoustic wall panel options available in the market that can effectively reduce noise pollution.
11. **Turn off the electronic or reduce the volume.** Game systems, computers, Hi-fi systems, and televisions can contribute to noise pollution when on high volumes. The solution is to turn them off when not in use and also keep them on moderate volume to reduce noise pollution. Besides, by turning them off you'll also be saving electricity costs.
12. **Plant trees.** Trees have been established to be effective in reducing noise levels within urban settings, around major highways, and even at the places we stay. Therefore, numerous plants and trees in an area mean less noise pollution. In addition to that, trees have various aesthetic advantages and improve air quality.
13. **Have a dedicated quiet space.** Having a dedicated quite space can pay off whenever we want to escape the noises that make us uncomfortable and reduce the quality of life. Quite spaces can guarantee as much as 100% soundproof areas.
14. **Install cubicles and wall partitions.** In places with large free space such as offices and other big rooms at home, wall partitioning and the use of cubicles will reduce the overall indoor noise. Cubicles and wall partitions act as noise absorbers and prove very effective even with low-level installation.

Environmental Legislation

Environmental legislation is a collection of many laws and regulations aimed at protecting the environment from harmful actions. Learn about the National Environmental Policy Act and other environmental laws.

The Environment

It feels good to step outside and breathe a big breath of fresh air. Having clean air, clean water and an environment free of toxins and pollutants has always been a desire of man. But, prior to the 1970s, there were few mechanisms in place to protect the environment and the natural resources found within the United States of America. Mounting concerns about air, water and land quality led to environmental legislation designed to protect the environment from harmful actions. In this lesson, we will learn about some groundbreaking laws and discuss how government regulations safeguard the health of our natural world.

Environmental Legislation

Environmental legislation is the collection of laws and regulations pertaining to air quality, water quality, the wilderness, endangered wildlife and other environmental factors. The umbrella of environmental legislation covers many laws and regulations, yet they all work together toward a common goal, which is regulating the interaction between man and the natural world to reduce threats to the environment and increase public health.

As you might imagine, environmental legislation is a broad topic, mainly because the natural environment encompasses so many different aspects. So, environmental laws need to consider everything, from the air we breathe to the natural resources we rely on to the plants and animals that share this world with us.

To better understand environmental law, let's look at an example. Let's say that an energy company wants to build a coal-burning power plant to create electricity for the community. Where should this power plant be built? What type of pollutants might result from the coal burning, and what measures will need to be taken to control harmful emissions? If the power plant is built at the edge of town to lessen air pollution for the human population, how will this impact lesser species that inhabit the land downwind of the plant? These are all considerations to be evaluated within the scope of environmental law.

Environment Protection Act,1986

is an Act of the Parliament of India. In the wake of the Bhopal Tragedy, the Government of India enacted the Environment Protection Act of 1986 under Article 253 of the Constitution. Passed in March 1986, it came into force on 19 November 1986. It has 26 sections. The purpose of the Act is to implement the decisions of the United Nations Conference on the Human Environments. They relate to the protection and improvement of the human environment and the prevention of hazards to human beings, other living creatures, plants and property. The Act is an “umbrella” legislation designed to provide a framework for

central government coordination of the activities of various central and state authorities established under previous laws, such as the Water Act

Central Pollution Control Board

(CPCB) of India is a statutory organisation under the Ministry of Environment, Forest and Climate Change (MoE,FCC). It was established in 1974 under the Water (Prevention and Control of Pollution) Act, 1974. CPCB is also entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. It serves as a field formation and also provides technical services to the Ministry of Environment and Forests under the provisions of the Environment (Protection) Act, 1986. It Co-ordinates the activities of the State Pollution Control Boards by providing technical assistance and guidance and also resolves disputes among them. It is the apex organisation in country in the field of pollution control, as a technical wing of MoEF.^{[3][4]} The board is led by its chairman, who is nominated by the Central Government.^[5] The current acting chairman is *Shri S.P. Singh PariharIAS* .^[6]

CPCB has its head office in New Delhi, with seven zonal offices and 5 laboratories. The board conducts environmental assessments and research. It is responsible for maintaining national standards under a variety of environmental laws, in consultation with zonal offices, tribal, and local governments. It has responsibilities to conduct monitoring of water and air quality, and maintains monitoring data. The agency also works with industries and all levels of government in a wide variety of voluntary pollution prevention programs and energy conservation efforts. It advises the central government to prevent and control water and air pollution. It also advises the Governments of Union Territories on industrial and other sources of water and air pollution. CPCB along with its counterparts the State Pollution Control Boards (SPCBs) are responsible for implementation of legislation relating to prevention and control of environmental pollution.^[1]

Environmental assessment

(EA) is the assessment of the environmental consequences (positive and negative) of a plan, policy, program, or actual projects prior to the decision to move forward with the proposed action. In this context, the term "**environmental impact assessment**" (EIA) is usually used when applied to actual projects by individuals or companies and the term "strategic environmental assessment" (SEA) applies to policies, plans and programmes most often proposed by organs of state.^{[1][2]} Environmental assessments may be governed by rules of administrative procedure regarding public participation and documentation of decision making, and may be subject to judicial review.

The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a project. The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made".^[3] EIAs are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts.

What is global warming?

Global warming is the current increase in temperature of the Earth's surface (both land and water) as well as its atmosphere. Average temperatures around the world have risen by 0.75°C (1.4°F) over the last 100 years about two thirds of this increase has occurred since 1975.^{1 2} In the past, when the Earth experienced increases in temperature it was the result of natural causes but today it is being caused by the accumulation of greenhouse gases in the atmosphere produced by human activities.³

The natural greenhouse effect maintains the Earth's temperature at a safe level making it possible for humans and many other lifeforms to exist.⁴ However, since the Industrial Revolution human activities have significantly enhanced the greenhouse effect causing the Earth's average temperature to rise by almost 1°C. This is creating the global warming we see today. To put this increase in perspective it is important to understand that during the last ice age, a period of massive climate change, the average temperature change around the globe was only about 5°C.^{5 6}

Greenhouse effect

The **greenhouse effect** is the process by which radiation from a planet's atmosphere warms the planet's surface to a temperature above what it would be without its atmosphere.

If a planet's atmosphere contains radiatively active gases (i.e., greenhouse gases) they will radiate energy in all directions. Part of this radiation is directed towards the surface, warming it.^[3] The intensity of the downward radiation – that is, the strength of the greenhouse effect – will depend on the atmosphere's temperature and on the amount of greenhouse gases that the atmosphere contains.

Earth's natural greenhouse effect is critical to supporting life. Human activities, mainly the burning of fossil fuels and clearing of forests, have strengthened the greenhouse effect and caused global warming.

The term "greenhouse effect" arose from a faulty analogy with the effect of sunlight passing through glass and warming a greenhouse.

Acid rain

Acid rain is a rain or any other form of precipitation that is unusually acidic, meaning that it has elevated levels of hydrogen ions (low pH). It can have harmful effects on plants, aquatic animals and infrastructure. Acid rain is caused by emissions of sulphur dioxide and nitrogen oxide, which react with the water molecules in the atmosphere to produce acids. Some governments have made efforts since the 1970s to reduce the release of sulphur dioxide and nitrogen oxide into the atmosphere with positive results. Nitrogen oxides can also be produced naturally by lightningstrikes, and sulphur dioxide is produced by volcanic eruptions. Acid rain has been shown to have adverse impacts on forests, freshwaters and soils, killing insect and aquatic life-forms, causing paint to peel, corrosion of steel structures such as bridges, and weathering of stone buildings and statues as well as having impacts on human health.

Types of Disasters

Body

Learn about the different types of natural and human-caused disasters and their impact on behavioral health.

Natural and human-caused disasters affect thousands of people each year. Major adverse events such as these have the potential to cause catastrophic loss of life and physical destruction. They are often unexpected and can leave whole communities in shock.

People who live through a disaster can experience emotional distress. Feelings of anxiety, constant worrying, trouble sleeping, and other depression-like symptoms are common responses to disasters before, during, and after the event. Many people are able to “bounce back” from disasters with help from family and the community, but others may need additional support to cope and move forward on the path of recovery. Anyone can be at risk, including survivors living in the impacted areas and first responders and recovery workers.

Natural Disasters

Natural disasters are large-scale geological or meteorological events that have the potential to cause loss of life or property. These types of disasters include:

- [Tornadoes and Severe Storms](#)
- [Hurricanes and Tropical Storms](#)
- [Floods](#)
- [Wildfires](#)
- [Earthquakes](#)
- [Drought](#)

Severe storms and floods are the most common types of natural disasters reported in the United States. These meteorological events are occasionally preceded by presidential “emergency declarations” requiring state and local planning prior to the event, such as evacuations and protection of public assets. Disaster Distress Helpline staff are available to speak to those who call or text before, during, and after a natural disaster.

Human-Caused Disasters

Examples include industrial accidents, shootings, acts of terrorism, and [incidents of mass violence](#). As with natural disasters, these types of traumatic events may also cause loss of life and property. They may also prompt evacuations from certain areas and overwhelm behavioral health resources in the affected communities.

In the aftermath of the tragic loss of life that occurred on September 11, 2001, the feelings of loss of security and well-being—arguably the most crucial ingredients for leading a happy, healthy life—dramatically affected the citizens of the United States. Disaster Distress Helpline staff are also trained to respond to calls or texts related to these types of disasters.

- [Toolkit of Behavioral Health Resources Pertaining to the Israel-Hamas Conflict \(PDF | 371\)](#)
- [Incidents of Mass Violence](#)

Other Incidents of Mass Trauma

Infectious disease outbreaks, incidents of community unrest, and other types of traumatic events can also bring out strong emotions in people. The Disaster Distress Helpline provides immediate crisis counseling to people affected by traumatic events.

- [Coping with Grief After Community Violence – 2014](#)
- [Coping with Stress During Infectious Disease Outbreaks – 2014](#)

- Talking with Children: Tips for Caregivers, Parents, and Teachers During Infectious Disease Outbreaks – 2014

Disaster preparedness

Disaster preparedness consists of a set of measures undertaken in advance by governments, organisations, communities, or individuals to better respond and cope with the immediate aftermath of a disaster, whether it be human-induced or caused by natural hazards. The objective is to reduce the loss of life and livelihoods.

Simple initiatives can go a long way, for instance in training for search and rescue, establishing early warning systems, developing contingency plans, or stockpiling equipment and supplies.

Disaster preparedness plays an important role in building the resilience of communities.

Why is this important?

With increasing population growth, rapid and unplanned urbanisation, climate change, environmental degradation and widespread poverty, a growing number of people and assets are exposed to disasters.

Moreover, many of these events occur in fragile and conflict-affected states, thus increasing the complexity of crises and overburdening countries experiencing violent conflict or fragile governance.

However, improved practice and response mechanisms save lives and strengthen the countries and communities' ability to reduce the impact of disasters.

Understanding the occurrence and frequency of natural hazards, as well as the risks, vulnerabilities and potential impact on people and assets, helps to improve preparedness.

Instead of providing emergency response only, international efforts should help governments and communities invest in understanding risks and building preparedness capacities for pre-emptive and early action. Disaster preparedness is cost-effective and saves aid money.

These concepts are agreed upon and firmly embedded into international commitments, including the 2015 Sendai Framework for Disaster Risk Reduction, the Paris Agreement (2015), the Agenda 2030, the New Urban Agenda, and the Grand Bargain commitments.

The approach promotes multi-hazard preparedness and anticipatory action as a means for a quicker and more effective response. It focuses not only on disasters related to natural hazards but also on human-induced threats like conflict and violence, epidemics, and biological hazards.

Under this approach, the EU aims to mainstream preparedness and risk reduction measures across all its humanitarian programming.

In addition, the EU allocates more than €78 million of its annual humanitarian funding to targeted preparedness actions. This funding strengthens the ability of national and local preparedness systems to respond earlier and better.

The EU invests in early warning systems, monitoring and building national and local capacities for the response.

Some examples of disaster preparedness in EU-funded humanitarian aid interventions are:

- Support communities in Bangladesh to better forecast and act ahead of monsoon floods
- Advice local governments in the Philippines in scaling up inclusive cash assistance programmes that reach marginalised urban communities affected by disasters
- Support national and local governments in Mozambique in using drone and satellite data for disaster preparedness and to assess the extent of people's needs following a natural hazard
- Strengthening emergency preparedness and response in the Caribbean through better coordination of humanitarian logistics in the event of a natural hazard.

More examples of the EU's action in disaster preparedness are available in the [Compendium of experiences](#) published in 2020.

Each disaster preparedness strategy and funding allocation includes a defined exit strategy where local capacities are deemed adequate or where local governments or development partners can take over.

Additionally, the EU engages and supports local and national government structures in all countries worldwide through the [EU Civil Protection Mechanism](#), notably within the areas of prevention and preparedness.

Facts & figures

The EU is supporting early warning and monitoring systems, and funds projects to strengthen disaster response capacities at national and local levels

In 2022, the EU invested **€76.5 million** in **69 disaster preparedness actions** in more than **40 countries**.

In 2023, the budget for targeted disaster preparedness actions amounts to over **€78 million**

