आर्टिफिशियल इंटेलिजेंस
Artificial Intelligence

कक्षा / Class IX

2025-26

विद्यार्थी सहायक सामग्री
Student Support Material

केन्द्रीय विद्यालय संगठन~Kendriya Vidyalaya Sangathan

संदेश

विद्यालयी शिक्षा में शैक्षिक उत्कृष्टता प्राप्त करना एवं नवाचार द्वारा उच्च - नवीन मानक स्थापित करना केन्द्रीय विद्यालय संगठन की नियमित कार्यप्रणाली का अविभाज्य अंग है। राष्ट्रीय शिक्षा नीति 2020 एवं पी. एम. श्री विद्यालयों के निर्देशों का पालन करते हुए गतिविधि आधारित पठन-पाठन, अनुभवजन्य शिक्षण एवं कौशल विकास को समाहित कर, अपने विद्यालयों को हमने ज्ञान एवं खोज की अद्भुत प्रयोगशाला बना दिया है। माध्यमिक स्तर तक पहुँच कर हमारे विद्यार्थी सैद्धांतिक समझ के साथ-साथ, रचनात्मक, विश्लेषणात्मक एवं आलोचनात्मक चिंतन भी विकसित कर लेते हैं। यही कारण है कि वह बोर्ड कक्षाओं के दौरान विभिन्न प्रकार के मूल्यांकनों के लिए सहजता से तैयार रहते हैं। उनकी इस यात्रा में हमारा सतत योगदान एवं सहयोग आवश्यक है - केन्द्रीय विद्यालय संगठन के पांचों आंचलिक शिक्षा एवं प्रशिक्षण संस्थान द्वारा संकलित यह विद्यार्थी सहायक- सामग्री इसी दिशा में एक आवश्यक कदम है । यह सहायक सामाग्री कक्षा 9 से 12 के विद्यार्थियों के लिए सभी महत्वपूर्ण विषयों पर तैयार की गयी है। केन्द्रीय विद्यालय संगठन की विद्यार्थी सहायक-सामग्री अपनी गुणवत्ता एवं परीक्षा संबंधी सामग्री संकलन की विशेषज्ञता के लिए जानी जाती है और शिक्षा से जुड़े विभिन्न मंचों पर इसकी सराहना होती रही है। मुझे विश्वास है कि यह सहायक सामग्री विद्यार्थियों की सहयोगी बनकर निरंतर मार्गदर्शन करते हुए उन्हें सफलता के लक्ष्य तक पहुँचाएगी।

शुभाकांक्षा सहित ।

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CURRICULUM 2025-26

UNIT-I

Communication Skills-I

Learning Outcomes:

- Demonstrate knowledge of various methods of communication
- Identify elements of communication cycle
- Identify the factors affecting our perspectives in communication
- Demonstrate the knowledge of basic writing skills

Main points

- **What is Communication?**

Communication is the process of exchanging or passing information, ideas or thoughts from one person to the other in a meaningful way. It plays a major role in **developing personality**, improving **relationships**, and achieving **success** in school and the workplace.

- **Importance of Communication Skills**
  - Helps express thoughts and feelings clearly
  - Builds confidence and improves teamwork
  - Essential in both personal and professional life
  - Communication skills are needed to inform any facts and influence people.
- **Elements of the Communication Cycle**

  Sender: The one who initiates the communication
  Message: The idea/content that is being communicated
  Encoding: Converting message into the form suitable for the required medium
  Communication channel: Medium through which communication take place
  Receiver: The person/group receiving the message
  Decoding: Converting received message in a form understandable by receiver
  Feedback: Response to convey if the message is successfully received or not.

- **7 Cs of communication**
  - **Clarity** – The message should be clear and easily understood.

- **Conciseness** – Use simple words and say only what is needed.
- **Correctness** – Use accurate spelling, proper grammar, and appropriate language.
- **Completeness** – Include all necessary information.
- **Concreteness** – Use exact words and phrases.
- **Courtesy** – Be respectful, polite, and considerate of the receiver's feelings.
- **Coherence** – Ensure the message is logical and well-organized.

- **Types of Communication**

Verbal Communication-Verbal communication is the sharing of information by using words.

  - **Oral** -Communication which involves talking. Eg: speech, phone call.
  - **Written** -Communication which involves written or typed words. Eg: email, SMS, News paper.

Non-verbal Communication-The message we send to others without using any words.

  - Body language, facial expressions, gestures, tone of voice, eye-contact etc.

- **Visual Communication-** Exchanging Information only through Images/visuals.
  - Traffic light, signs, charts, graphs etc.

- **Factors affecting perspectives in communication (Barriers to Communication)**

Physical – Noise, poor connection
Linguistic – Language or vocabulary issues
Interpersonal – Personal attitudes or emotions
Organizational – Rules or hierarchy
Cultural – Differences in customs and beliefs
Past Experiences-What someone has been through in life can affect how they see or hear things
Emotions-If someone is angry, sad, or happy, it can change how they send or receive a message**.**
Prejudice-Preconceived notions or biases can cloud objective understanding.

Factors affecting perspectives in communication

Factor	How the factor can become a barrier
Language	Language is the primary tool for communication. However, when there are differences or issues in language use, it can create barriers that prevent the message from being understood correctly.
Visual perception	Effective communication requires being aware of how visual signals are perceived. To avoid barriers, visual elements should be clear, culturally appropriate, and supported with verbal explanations when necessary..
Past experiences	People may judge the speaker or message based on past experiences, not on current reality. Example: If someone had a bad experience with a doctor earlier, they may not trust or listen to a new doctor easily.
Prejudices	Prejudices stop people from understanding each other clearly. To communicate effectively, it is important to be open-minded, respectful, and free from unfair judgments.
Feelings	Feelings or emotions can affect the way we send, receive, and interpret messages. When not managed properly, they can become a barrier to effective communication.
Environment	Noise or disturbance in the surroundings may make communication difficult. Example, talking to a friend in a function where there is loud music being played by the orchestra.

Personal Factors	Personal factors include your own feelings, habits and ways of thinking. For example, fear, and low confidence may make communication difficult.
Culture	Signs' which have a different meaning in different cultures, such as showing a thumb may mean 'good job' done for some people but may be insulting to others.

- **Writing Skills**

Writing is an important part of communication. Good writing makes your message **clear, correct, and easy to understand**.

- **Phrases** -A phrase is a group of words that work together to give meaning, but do not form a complete sentence. Eg: a beautiful painting, is writing.
- **Kinds of sentences** -
  Declarative – Makes a statement (I love AI.)
  Interrogative – Asks a question (Do you like reading?)
  Imperative – Gives a command/request (Please sit down.)
  Exclamatory – Expresses strong emotion (What a surprise!)
- **Parts of sentence** -A sentence is a group of words that makes complete sense.
  Basic sentence structure:
  Subject + Verb + Object
  Example: She (subject) is reading (verb) a book (object).

- **Parts of speech** -

  The **8 parts of speech** are the building blocks of sentences:

  1. **Noun** – Names of people, places, things (e.g., school, teacher)

2. **Pronoun** – Replaces a noun (e.g., he, she, it)
3. **Verb** – Action words (e.g., run, write)
4. **Adjective** – Describes a noun (e.g., tall, smart)
5. **Adverb** – Describes a verb (e.g., quickly, silently)
6. **Preposition** – Shows relation (e.g., in, on, at)
7. **Conjunction** – Joins words/sentences (e.g., and, but, because)
8. **Interjection** – Expresses emotion (e.g., Wow!, Oh no!)

- **Use of articles** - Articles help determine whether you are referring to something of a specific type or something of a general type.Eg:the,an,a
- **Construction of a paragraph**-A group of sentences makes a paragraph.It begins with a topic sentence followed by supporting sentences and concluding sentence.

MULTIPLE CHOICE QUESTIONS

Q1. What plays a key role in helping people understand each other in society?

a) Competition b) Communication

c) Silence d) Rules

Q2. Which of the following is not an example of oral communication?

a) Telephonic conversation b) Face-to-face interview

c) Voice message d) Reading a book silently

Q3. Assertion (A): Active listening helps in building strong interpersonal relationships.

Reason (R): Active listening involves interrupting the speaker to ask frequent questions.

a) Both A and R are true, and R is the correct explanation of A.
b) Both A and R are true, but R is not the correct explanation of A.
c) A is true, but R is false.
d) A is false, but R is true.

Q4.  **What type of communication is shown by this sign?**

a) Verbal communication b) Written communication
c) Visual communication d) Oral communication

Q5. Arjun is part of a school group project. During the discussion, he allows each member to share their ideas without interruption. When it's his turn, he presents his points in simple language so everyone can understand. He also rephrases confusing ideas shared by others to help the team reach a common understanding.

Which quality displayed by Arjun shows that he is an effective communicator?

a) Speaking in a foreign accent b) Dominating the discussion
c) Using simple and clear language d) Ignoring others' suggestions

Q6. What is the role of feedback in communication?

a) To stop communication b) To understand the message and respond
c) To ignore the message d) To confuse the sender

Q7. In the communication cycle, what is the role of the 'receiver'?

a)To send the message b) To encode the message
c) To decode and understand the message d) To block the message

Q8. During a team meeting, some members from different countries feel uncomfortable because their traditions and customs are not understood or respected by others. This situation is an example of which communication barrier?

a) Cultural barrier b) Technical barrier
c) Semantic barrier d) Environmental barrier

Q9. What is the primary advantage of written communication over oral communication?

a) It allows immediate feedback b) It provides a permanent record

c) It is faster d) It is more personal

Q10. Identify the part of speech of the underlined word:
She quickly finished her homework.

a) Noun b) Adverb
c) Adjective d) Verb

Q11. Which of these is NOT a characteristic of good communication?
a) Clear and concise b) Honest and respectful
c) Confusing and vague d) Relevant and purposeful

Q12. What does the body language in the image most likely express?
a)Happiness b) Confidence
c) Disagreement or defensiveness d) Interest

Q13. Which of these is an example of formal communication?
a) Chatting with friends b) Writing a business letter
c) Whispering secrets d) Talking to siblings

Q14. What does 'tone of voice' affect in communication?
a) The speed of talking b) The meaning and feeling behind words
c) The font size d) The spelling of words

Q15. What is the best way to improve your communication skills?

a)Practicing active listening b) Expanding your vocabulary
c) Speaking clearly and confidently d) All of the above

Answers:

1.b	**2.d**	**3.c**	**4.c**	**5.c**
6.b	**7.c**	**8.a**	**9.b**	**10.b**
11.c	**12.c**	**13.b**	**14.b**	**15.d**

SHORT ANSWER TYPE QUESTIONS

Q1. What is communication? Explain briefly.

Communication is the process of exchanging information, ideas, thoughts, or feelings between two or more people. It helps in understanding and building relationships by sharing messages clearly.

Q2. Differentiate between verbal and non-verbal communication.

Verbal communication uses spoken or written words to convey a message, such as talking or writing a letter.Non-verbal communication uses body language, gestures, facial expressions, and tone of voice to communicate without words.

Q3. Why is feedback important in communication?

Feedback is important because it lets the sender know if the message was understood correctly. It also helps improve communication by allowing corrections or clarifications, making the process effective.

Q4. What are the factors that affect perspective in communication?

Several factors can affect the effectiveness of communication. These include: Visual Perception, Language, Past Experience, Prejudices, Feelings, Environment.

Q5. Explain the role of body language in communication.

Body language plays a crucial role as it conveys emotions and attitudes without words. Gestures, eye contact, facial expressions, and posture can reinforce or contradict the spoken message, helping the listener understand the speaker's feelings better.

Q6. What do you mean by active listening? How does it help?

Active listening means fully concentrating, understanding, responding, and remembering what the speaker says. It helps by ensuring the listener understands the

message correctly and encourages better two-way communication.

Q7. Why should messages be clear and concise?

Clear and concise messages prevent misunderstandings and confusion. They ensure the receiver easily understands the main point without unnecessary details or ambiguity, making communication more effective.

Q8. Mention two advantages of written communication.

It provides a permanent record that can be referred to later.

It allows the sender to organize thoughts carefully and present them clearly.

Q9. Explain how environmental factors can act as barriers to effective communication. Give two examples to support your answer.

Environmental factors can act as barriers to effective communication by causing distractions or making it difficult for the sender and receiver to exchange information clearly.

For example:

1. Noise – Loud background noise (like traffic or machinery) can prevent the listener from hearing the speaker properly.
2. Poor lighting or physical setting – A poorly lit room or uncomfortable seating can distract the receiver and reduce their ability to concentrate on the message.

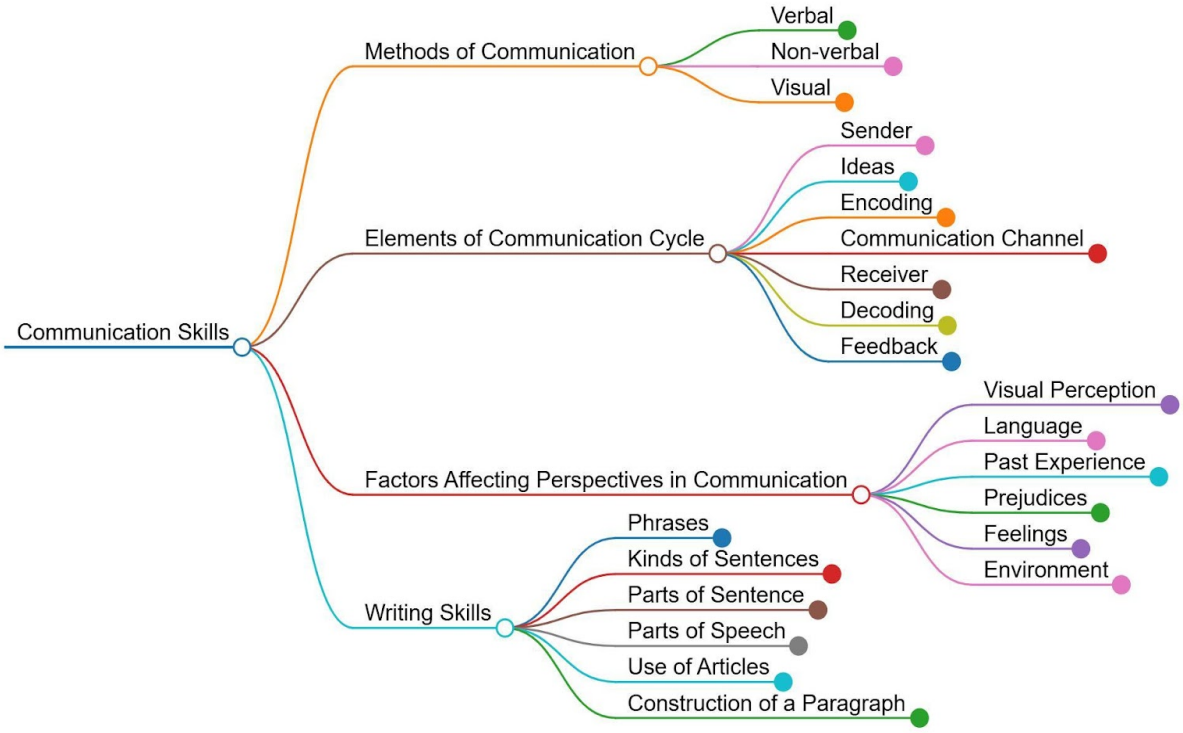
Q10. What are the advantages of visual communication? (Any two)

- Visuals like charts, graphs, images, and videos help convey complex information quickly and clearly, making it easier for people to grasp the message.
- Visual communication can be understood across different languages and cultures, making it a universal way to share ideas.

Reference link:

https://ncert.nic.in/vocational/pdf/iees101.pdf

MIND MAP


Communication Skills
Methods of Communication
Verbal
Non-verbal
Visual
Elements of Communication Cycle
Sender
Ideas
Encoding
Communication Channel
Receiver
Decoding
Feedback
Factors Affecting Perspectives in Communication
Visual Perception
Language
Past Experience
Prejudices
Feelings
Environment
Writing Skills
Phrases
Kinds of Sentences
Parts of Sentence
Parts of Speech
Use of Articles
Construction of a Paragraph

UNIT-II (SELF MANAGEMENT SKILLS-I)

Self-management, also referred to as 'self-control,' is the ability to control one's emotions, thoughts and behaviour effectively in different situations.

LEARNING OUTCOMES:

- To know the meaning and importance of self-management
- To identify the factors that helps in building self-confidence

MAIN POINTS

This unit focuses on self-management skills, emphasizing the importance of self-awareness, self-control, self-confidence, self-motivation, positive thinking, goal setting, and time management.

Introduction to Self-Management

Self-management starts with knowing one's self, identifying their interests and skills, fostering a positive image about themselves, and taking care of oneself that builds self-confidence with regard to self-grooming.

Self-management can also help in:

- Developing good habits
- Overcoming bad habits
- Reaching your goals
- Overcoming challenges and difficulties

Self-management skills include the following:

- **Self-awareness:** Knowing yourself as an individual – your values, likes, dislikes, strengths and weaknesses.
- **Self-control:** Ability to control your behaviour, discipline, etc.
- **Self-confidence:** Believing in yourself that you can do any task that is given to you and not scared of taking risks
- **Problem solving:** Understanding a problem and finding a solution using step-by-step methods.
- **Self-motivation:** Doing tasks on your own without any external motivation.

- **Personal hygiene and grooming:** Keeping oneself clean, healthy and smart.
- **Team work:** Working together with people to accomplish shared goals.
- **Positive thinking:** Expressing certainty or affirmation even in tough situations.
- **Time management:** Achieving tasks on time and according to the plan.
- **Goal setting:** Planning concrete goals to be accomplished within a set timeframe.

Strength and Weakness Analysis

You can identify your strengths by:

• Take time off to think about what you do well
• Think of anything that you are always good at
• Think about what others appreciate about you

You can identify your weakness by:

• Mark the places where you are facing challenges and what is difficult for you.
• Consider the comments and responses you get from other people.
• Take criticism openly without feeling belittled and embrace your weaknesses. Think of them as steps towards growth.

Self-confidence

Self-confidence can be described as the ability to trust one's skills and abilities. A highly skilled and talented individual who does not possess an ounce of self-confidence or takes the initiative is quite likely to remain unnoticed by others. Self-confidence can be worked upon with the attitude and actions that are taken.

Qualities of self-confident people

- Self-belief
- Hard Work
- Positive Attitude
- Commitment

Building self-confidence

The three steps to building self-confidence are as follows:

Step-1: Appreciate achievements and accept failures.

Step-2: Have a goal and steps towards it.

Step-3: Always look at the good side and be happy

Positive Thinking

Positive thinking is a mental and emotional attitude that focuses on the bright side of life and expects positive results.

Positive thinking and its importance

A person can have an attitude that is positive or negative. Positive thinking is looking at the good in things, observing, understanding, and working patiently towards improving it instead of worrying and/or looking for the bad in it. There is no doubt positive thinking will fetch you rewards like

- Overcoming challenges,
- Making you do well or making you an energetic individual
- Helping you get better at work, and
- Making you and people around you happy.

How to keep thinking Positive?

There are few simple steps to cultivate a positive attitude in life. Let us understand this with the help of the abbreviation '**SMILE**'.

- **S**tart your day in a positive way.
- **M**anage time to relax
- **I**magine the best in any situation
- **L**earn to take feedback in a positive way
- **E**xpress Gratitude.

Personal Hygiene

Cleanliness means keeping ourselves tidy. Staying clean has an impact on our health and well-being. Good health lets you show up at school, college or work.

Personal hygiene is important because, it helps us

- Stay healthy.
- Create a good image of ourselves.
- Avoid feeling ashamed in public due to our bad breath, body odour, etc.

Three steps to personal hygiene

CARE

- Maintain dandruff-free hair
- Apply oil or cream to nourish your skin
- Clean your teeth each day
- Replace your toothbrush when it loses shape
- Trim your nails

WASH

- Clean your hands often
- Shower daily
- Clean your clothes
- Clean your hair at least every other day
- Clean your feet

AVOID

- Blow your nose/cough into a handkerchief to avoid spreading germs
- Keep your feet dry and change your socks every day

Grooming

Grooming is the process of making yourself look neat, tidy and smart. The way you dress, and groom can either send the message that you are confident, smart and sincere or possess opposite qualities. Dressing and grooming are important because they help us

- Look smart
- Feel confident about ourselves
- Make a good impression of ourselves

Guidelines for dressing and grooming

CLOTHES

- Clothes should be clean, neat, and ironed
- Shoes should be clean and polished
- Change socks every day and always wear clean socks
- Keep accessories like belts, jewellery, etc., simple
- In certain jobs display of bodily tattoos and piercing is not accepted

HAIR

- Hair should be washed regularly to keep clean
- Simple hair styles and well combed hair gives a smart look

FACE

Face looks clean if you shave regularly

- Moustache should be neatly trimmed
- Teeth should be kept clean, without any stains
- Brush the teeth twice a day to maintain dental hygiene
- Avoid eating *Paan or* chewing beetles.

MULTIPLE CHOICE QUESTIONS

Q1. Which of the following is not a self-management skill?

a) Problem solving
b) Bargaining
c) Understanding self
d) Confidence building

Q2. Grooming is a term associated with

a) time management
b) problem solving
(c) neat and clean appearance
(d) self-management

Q3. What steps should one take to build confidence?

a) Set goals in life
b) Always think positively
(c) Appreciate oneself for all the achievements
(d) Talk to people who are confident

Q4. Which of the following is a quality of a self-confident person?

a) Patient (c) Committed
b) Compassionate (d) Passionate

Q5. What is the best way to start our day positively?

a) Think about all that can go wrong.
b) Think about the difficult test you will face during the day.
c) Think about all your accomplishments so far and feel good about it.
d) Think about the traffic on the road and feel stressed.

Q6. Jayashree gets feedback on her project work from her class teacher. Which of these options demonstrates a positive attitude in this situation?

a) Jayashree ignores the feedback.
b) Jayashree takes the feedback but does not use it.
c) Jayashree tells others that the teacher is wrong.
d) Jayashree learns from the feedback and makes her project work better.

Q7. What can you do to get rid of negative thoughts or feelings?

a) Meditate to calm down and feel positive.
b) Ignore them and move on in life.
c) Act based on negative thoughts or feelings.
d) Talk to a friend and share all your negative feelings.

Q8. Do you think people living in hill stations can skip taking a bath for many days?

a) No, irrespective of the climate, one should take a bath regularly.
b) Yes, not taking a bath for many days is acceptable for people staying in cold climates.
c) Yes, if they wipe themselves with a wet cloth, then it is fine.
d) None of the above.

Q9. Gitashree wants to grow her hair and she applies a lot of hair oil. She does not wash her hair for days and sometimes it smells bad too. What would be your suggestion to her?

a) She can leave the oil in her hair, after all it helps her hair to grow.
b) She can leave it on at night and wash her hair every day before leaving home.
c) She should not apply the oil at all.
d) She can apply the oil and pour a little water on her hair before leaving home to reduce the smell.

Q10**.** Dressing and grooming are important because they help us to look ____.

a) smart
b) untidy
c) shabby
d) All of the above

Q11. The following image is an example of _____ shirt.

a) informal
b) formal
c) Both of the above
d) None of the above

Q12. The following image is an example of _____ T-shirt.

a) informal
b) formal
c) Both of the above
d) None of the above

Answers:

Q.1 (b)	Q2 (c)	Q3 (c)	Q4 (c)	Q5 (c)	Q6 (d)
Q.7 (a)	Q8 (a)	Q9 (b)	Q10 (a)	Q11 (b)	Q12 (a)

SHORT ANSWER QUESTIONS

Q1. What is Self-management?

Ans: **Self-management** is the ability to regulate your own emotions, thoughts, and

behaviors effectively in different situations. It involves skills like self-discipline, time management, goal-setting, and staying motivated to achieve personal and professional objectives without needing constant supervision.

Q2. List any 04 self-management skills.

Ans: Here are four important self-management skills:

a) **Time Management** – Effectively planning and controlling how you spend your time.
b) **Self-Motivation** – Staying driven to achieve goals without external encouragement.
c) **Stress Management** – Handling pressure and maintaining emotional control.
d) **Goal Setting** – Defining clear, achievable objectives and working steadily toward them.

Q3. What is strength and weakness?

Ans:

- **Strength** refers to a personal quality or skill that helps you manage yourself effectively — for example, being organized, staying focused, or handling stress well.
- **Weakness** is a trait that hinders effective self-management — such as procrastination, poor time management, or difficulty staying motivated.

Q4. How to identify the strength and weakness?

Ans: You can identify strengths and weaknesses through:

- **Self-reflection** – Regularly assess your habits, behaviors, and performance in different situations.
- **Feedback from others** – Ask teachers, peers, or mentors for honest input on your skills.
- **Performance reviews** – Analyze your success or struggles in completing tasks and reaching goals.
- **Personality or skills assessments** – Use tools or quizzes to reveal areas of strength and those needing improvement.

Q5.Write the Difference between interests and abilities**.**

Ans:

Interests	Abilities
Things you enjoy doing or feel curious about.	Skills or talents you have developed or naturally possess.
Driven by personal preference and passion.	Determined by practice, learning, or innate capacity.
Can motivate you to pursue certainties or careers.	Enable you to perform tasks effectively and successfully.

Q6. What are the factors that affect self-confidence?

Ans: Factors that affect self-confidence include:

- **Past experiences** (successes or failures)
- **Feedback and support** from family, friends, or peers
- **Skills and knowledge** in a particular area
- **Body language and appearance**
- **Mental attitude** and self-talk (positive or negative)
- **Stress and anxiety levels**
- **Environment and social situations**

Q7. Write the Qualities of self-confident people.

Ans: Qualities of self-confident people include:

- They **believe in their abilities** and trust their judgment (Self Belief).
- They **handle criticism constructively** without losing motivation. (Positive attitude)
- Do hard work and face challenges without fear. (Hard work)
- They maintain **commitment** and communicate clearly. (Commitment)

Q8. What is Positive thinking? Write its importance.

Ans: **Positive thinking** is the practice of focusing on the good in any situation and expecting favorable outcomes.

Importance: It boosts mental well-being, reduces stress, improves problem-solving, and increases motivation, helping you achieve goals more effectively.

Q9. How to keep your thinking positive?

Ans: To keep us thinking positive, we can:

- Practice **gratitude** by focusing on what we are thankful for.
- Replace negative thoughts with **positive affirmations**.
- Surround ourself with **supportive and uplifting people**.
- Focus on **solutions** instead of problems.
- Take care of our **physical health** through exercise and rest.
- Limit exposure to **negative media or influences**.

Q10. What is Personal Hygiene?

Ans: **Personal hygiene** is the practice of keeping your body clean and well-groomed to maintain health and prevent illness. It includes habits like regular bathing, handwashing, oral care, and wearing clean clothes.

Q11. Why Personal hygiene important?

Ans: Personal hygiene is important because it helps prevent the spread of germs and illnesses, keeps you feeling fresh and comfortable, and promotes good health and social confidence.

Q12. Write three steps to personal hygiene?

Ans: Three key steps to personal hygiene are:

1. **Regular bathing or showering** to keep your skin clean.
2. **Washing hands frequently** with soap to remove germs.
3. **Brushing your teeth** twice daily to maintain oral health.

Mind Map


coggle
made for free at coggle.it
Self Management Skills- Class IX
Grooming
Guidelines for dressing & Grooming
Face
Hair
Clothes
Positive Thinking
Helping you get better at work
Overcoming challenges
Making do well or making an energetic individual
Making you and people around you happy
Strength and Weakness Analysis
Your Strength
Your Weakness
Self-confidence
Qualities of self-confident people
Commitment
Positive Attitude
Self-belief
Hard Work
Building self-confidence
Step-1: Appreciate achievements and accept failures.
Step-2: Have a goal and steps towards it.
Step-3: Always look at the good side and be happy
Personal Hygiene
3 Steps to Personal Hygiene
Wash
CARE
Avoid
Different Self Management Skills
Problem solving
Time management
Self-motivation
Personal hygiene and grooming
Self Awareness
Team work
Self-confidence
Positive thinking
Goal setting
Self-control

UNIT-3: ICT Skills-I

LEARNING OUTCOMES:

- Describe the role of Information and Communication Technology (ICT) in day-to-day life and workplace
- Identify components of basic computer system and their functions
- Demonstrate use of various components and peripherals of computer system
- Demonstrate basic computer skills

MAIN POINTS:

Introduction to ICT

Definition: ICT (Information and Communication Technology) involves tools like computers, the Internet, radio, TV, and telephony to store, manage, and share information.

Importance: Essential for communication, business, education, and daily life.

Skills Needed:

- Operating computers.
- Browsing the Internet for information.

Applications of ICT

- **At Workplace**: Used in banking, education, retail, healthcare, etc., for tasks like online transactions, data management, and communication.
- **At Home**: Used for entertainment (TV, social media), communication (phones, emails), and online activities (shopping, learning).

ICT Tools: Smart phones and Tablets

Smart phones

- Advanced mobile phones with computer-like functions (browsing, emails, games, etc.).
- **Operating Systems**: Android, iOS, Windows Mobile.
- **Features**: Touch screen, apps, cameras, Wi-Fi, Bluetooth.

Tablets

- Larger than smart phones, used for reading, browsing, and multimedia.
- **Differences from Smart phones**:
    - Bigger screen.
    - Longer battery life.
    - Higher storage capacity.

Common Apps

- Default apps: Phone, Calendar, Camera, Mail, Maps, Browser.
- Downloadable apps: Social media (Facebook), utilities (WhatsApp), games, etc.

Parts of a Computer and Peripherals

Main Components

1. **Input Devices**: Keyboard, mouse, microphone, scanner.
2. **Output Devices**: Monitor, printer, speakers.
3. **CPU (Central Processing Unit)**:

    Control Unit: Manages operations.
    ALU (Arithmetic Logic Unit): Performs calculations.
    Memory Unit: Primary memory contains ROM and RAM.

RAM (Random Access Memory)	ROM (Read Only Memory)
Stores data temporarily	Stores data permanently
Information is lost when computer is switched off	Information cannot be changed easily

Storage Devices

- USB drives, hard disks, CDs, DVDs.
- **Memory Units**:
  Bit (smallest unit), Byte (8 bits), KB, MB, GB, TB.

8 bits = 1 byte
1024 bytes = 1 KB
1024 KB = 1 MB
1024 MB = 1 GB
1024 GB = 1 TB

Motherboard: Motherboard, also referred to as a system board, is the main circuit board inside a computer. It connects input, processing and output devices.

Ports and Connections

- **USB**: Connects peripherals (mouse, keyboard).
- **HDMI/VGA**: Connects monitors.
- **Audio Ports**: For headphones/microphones.
- **Ethernet**: For wired Internet.
- **Power Port**: Connects to electricity.

Basic Computer Operations

Hardware vs. Software

- **Hardware**: Physical parts (keyboard, monitor).
- **Software**: Programs (OS, apps). Examples: Windows, Ubuntu, Android.

Starting and Shutting Down

Power on → BIOS test → OS loads → Login.

Logout/Shutdown: Close all programs before turning off.

Using Keyboard and Mouse

- **Keyboard Functions**:
  Function keys (F1-F12), Control keys (Ctrl, Alt), Navigation keys (Arrow keys).
- **Mouse Actions**:
  Click, double-click, drag-and-drop, hover.

File Operations

Files and Folders

- **Files**: Store data (e.g., .txt, .docx, .jpg).
- **Folders**: Organize files.

Creating/Saving Files

1. Open a text editor (Notepad in Windows, Text Editor in Ubuntu).
2. Type content → Save with a filename (e.g., Neha.txt).

Keyboard Shortcuts

- CTRL+z: undo
- CTRL+x: cut
- CTRL+v: paste
- CTRL+y: redo
- CTRL+c: copy
- CTRL+p: print
- CTRL+a: select all
- CTRL+s: save

Internet Basics

Uses of Internet

- Search information, entertainment (movies, music), communication (email, social media), online shopping, banking, and learning.

Connecting to Internet

- **Requirements**: Device (computer/phone), modem, ISP.
- **Connection Types**:
  Wired (Ethernet cable).
  Wireless (Wi-Fi).

Internet Browsers

- Examples: Chrome, Firefox, Internet Explorer.
- **Searching**: Type keywords in the search bar.

Email: Electronic mail or e-mail is a quick way of sending messages to people using the Internet. Electronic mail is a message sent over the Internet from one person to another.

Creating an Account: Gmail, Yahoo, Outlook.

Writing an Email:

To: Recipient's address.

Subject: Brief topic.

Attachments: Files (photos, documents).

Managing Emails:

Reply/Forward: Respond or share emails.

Folders: Inbox, Sent, Trash.

MULTIPLE CHOICE QUESTIONS

Q1. What does ICT stand for?

a) Information Computing Technology

b) Information and Communication Technology

c) Internet Communication Tools

d) International Communication Technology

Q2. Which of the following is NOT an ICT tool?

a) Smartphone b) Radio

c) Typewriter d) Internet

Q3. What is the primary function of a CPU?

a) Displaying images b) Processing data and instructions

c) Storing files permanently d) Connecting to the Internet

Q4. Which key is used to move the cursor to the beginning of a new line?

a) Spacebar b) Enter

c) Tab d) Shift

Q5. What is the purpose of a web browser?

a) To create documents b) To search and view websites

c) To send emails d) To edit photos

Q6. Which of the following is an example of an output device?

a) Keyboard b) Mouse

c) Printer d) Scanner

Q7. What does RAM stand for?

a) Random Access Memory b) Read-Only Memory

c) Remote Access Memory d) Rapid Access Memory

Q8. Which of the following is a wireless communication technology?

a) USB b) Bluetooth

c) HDMI d) Ethernet

Q9. What is the function of the "Reply to All" option in email?

a) Delete the email
b) Send a reply to all recipients
c) Forward the email
d) Save the email as a draft

Q10. Which file extension is used for a Notepad document?

a) .doc
b) .jpg
c) .txt
d) .mp3

Q11. What is the purpose of a barcode scanner?

a) To print documents
b) To record items purchased in stores
c) To connect to the Internet
d) To play music

Q12. Which part of the computer is called the "brain"?

a) Monitor
b) CPU
c) Keyboard
d) Hard Disk

Q13. What is the function of the "Refresh" button in a web browser?

a) Close the browser
b) Reload the current webpage
c) Open a new tab
d) Bookmark a page

Q14. Which of the following is an example of an input device?

a) Speaker
b) Microphone
c) Monitor
d) Projector

Q15. What is the full form of GPS?

a) Global Payment System
b) General Processing System
c) Global Program System
d) Global Positioning System

Q16. Which key combination is used to copy text?

a) Ctrl + C
b) Ctrl + X
c) Ctrl + V
d) Ctrl + Z

Q17. What is the primary use of a tablet?

a) Making phone calls
b) Scanning barcodes
c) Printing documents
d) Reading books and browsing

Q18. Which folder holds unsent emails in Gmail?

a) Inbox
b) Sent
c) Drafts
d) Trash

Q19. What is the purpose of an Ethernet port?

a) To connect to a wireless network
b) To charge the device
c) To connect to high-speed Internet via cable
d) To play audio

Q20. Which of the following is NOT an email service provider?

a) Gmail b) WhatsApp

c) Outlook d) Yahoo Mail

ANSWERS

Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10
b	c	b	b	b	c	a	b	b	c
Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20
b	b	b	b	d	a	d	c	c	b

SHORT ANSWER QUESTIONS

Q1. Define ICT.

Answer: ICT stands for Information and Communication Technology, which includes tools like computers, the Internet, and smart phones for communication and data management.

Q2. Name two input and two output devices.

Answer:

- Input: Keyboard, Microphone
- Output: Monitor, Printer

Q3. What is the difference between RAM and ROM?

Answer:

- RAM can store data/information temporarily (contents are lost when power is off).
- ROM can store data/information permanently (contents are retained even when power is off).

Q4. What is the function of a web browser?

Answer: A web browser is used to access and view websites on the Internet.

Q5. What is the purpose of an operating system?

Answer: The operating system manages hardware and software resources and provides a user interface.

Q6. Name two popular mobile operating systems.

Answer: Android and iOS.

Q7. What is the use of a USB flash drive?

Answer: It is used to store and transfer data between computers.

Q8. What is the difference between a smart phone and a tablet?
Answer: A smart phone is primarily for calls and messaging, while a tablet has a larger screen for reading and browsing.
Q9. What is the function of the "Cc" field in an email?
Answer: “Cc” stands for carbon copy. It is used to send a copy of the email to additional recipients.
Q10. What is the purpose of a barcode scanner?
Answer: It scans barcodes to record product information in retail stores.
Q11. What is Wi-Fi?
Answer: Wi-Fi is a wireless technology used to connect devices to the Internet.
Q12. What is the difference between hardware and software?
Answer: Hardware is physical components (e.g., keyboard), while software is programs (e.g., Windows).
Q13. What is the function of a motherboard?
Answer: It connects all components of a computer, such as CPU, RAM, and storage.
Q14. What is the purpose of the "Attach" button in an email?
Answer: It allows users to send files (e.g., documents, images) with the email.
Q15. What is the use of a touch screen?
Answer: It allows users to interact with a device by touching the display.
Q16. What is the full form of URL?
Answer: Uniform Resource Locator (address of a webpage).
Q17. What is the purpose of a search engine?
Answer: It helps users find information on the Internet (e.g., Google).
Q18. What is the difference between a wired and wireless Internet connection?
Answer: Wired Internet connection uses cables (e.g. Ethernet), while wireless Internet connection uses Wi-Fi or mobile data or any wireless technology.
Q19. What is the function of the "Delete" button in email?
Answer: It moves the email to the Trash folder.
Q20. What is the purpose of a microphone in a computer?
Answer: It is used to record audio or for voice communication.

LONG ANSWER TYPE QUESTIONS

Q1. **Explain ICT's role in education.**
Answer: ICT enables e-learning (online classes, digital textbooks), virtual labs,

and global collaboration. Tools like Google Classroom help submit assignments, while video lectures make learning flexible. ICT (Information and Communication Technology) plays a crucial role in modern education by enhancing the teaching and learning process, making it more accessible, engaging, and personalized. It facilitates collaboration, provides access to vast resources, and equips learners with essential digital skills.

Q2. **Describe CPU components and functions.**

Answer:

- **Control Unit (CU):** Manages operations.
- **ALU (Arithmetic Logic Unit):** Performs calculations.
- **Memory Unit:** Temporarily stores data (RAM/ROM).

Q3. **Compare input and output devices with examples.**

Answer: Input and output devices are essential components of any computer system, acting as a bridge between the user and the machine. Input devices allow users to enter data and commands into the system, while output devices present the processed information to the user. Essentially, input devices give instructions to the computer, and output devices display the computer's response.

- **Input:** Send data to computer (e.g., keyboard, scanner).
- **Output:** Display/process data (e.g., monitor, printer).

Q4. **Steps to compose/send an email.**

Answer:

(i) Open email client (Gmail).
(ii) Click "Compose."
(iii) Enter recipient(s), subject, and message.
(iv) Attach files if needed.
(v) Click "Send."

Q5. **Advantages and risks of internet use.**

Answer: The advantages of the Internet include faster communication, easy access to information, and online learning. However, the disadvantages involve issues like cyber threats, misinformation, and addiction. Understanding the advantages and disadvantages of the Internet helps users make informed choices.

- **Pros:** Instant communication, online banking, e-learning.
- **Cons:** Cybercrime, privacy issues, misinformation.

Q6. **Explain computer memory types (RAM, ROM, Flash).**

Answer:

- **RAM:** Random Access Memory – Main memory of computer. Stores data temporarily. (lost on power-off).
- **ROM:** Read Only Memory- Stores data permanently. (e.g., BIOS).
- **Flash:** Portable (USB drives).

Q7. **How does data flow in a computer?**

Answer:

- Input → Processing (CPU) → Output.
- Example: Keyboard (input) → CPU processes → Monitor (output).

Q8. **Role of operating systems.**

Answer: An operating system (OS) acts as the core software that manages and controls a computer's hardware and software resources, providing a foundation for all other software programs. Its primary role is to serve as an interface between the user and the computer's hardware, allowing users to interact with the machine and execute programs efficiently. So we can say it manages hardware/software, provides UI (e.g., Windows), runs applications, and handles files.

Q9. **Smartphone vs. Tablet: Detailed comparison.**

Answer: Smartphones and tablets differ primarily in size and usage scenarios. Smartphones are designed for portability and constant connectivity, ideal for communication, on-the-go tasks, and quick access to information. Tablets, with their larger screens, excel in immersive experiences like media consumption, reading, and creating detailed artwork, offering a broader workspace and a more comfortable experience for these activities.

- **Smartphone:** Smaller, calling focus, portable.
- **Tablet:** Larger screen, better for media/reading, less portable.

Q10. **Steps to browse the internet safely.**

Answer:

1. Use a secure browser (Chrome/Firefox).
2. Avoid suspicious links.
3. Enable antivirus.
4. Use strong passwords.
5. Check for "HTTPS" in URLs.

REFERENCE/ LINKS TO RELEVANT MULTIMEDIA RESOURCES (E.G., VIDEOS, AUDIO CLIPS, ANIMATIONS) TO SUPPLEMENT LEARNING./INTERACTIVE ASSESSMENT:-

1:-
https://cbseacademic.nic.in/web_material/Curriculum26/Sec/EmployabilitySkills_IX.pdf

2:-
https://cbseacademic.nic.in/web_material/Curriculum21/publication/secondary/Employability_Skills_IX.pdf

MIND MAP


Information and Communication Technology (ICT) Skills
Internet
Hyperlinks: Clickable links to other pages.
Web address: URL, entered in the address bar.
WWW: World Wide Web, collection of linked web pages.
Connection: Wired (Ethernet), Wireless (Wi-Fi), via ISP
Bandwidth: Speed of data transfer (Kbps, Mbps, Gbps)
Browsers: Chrome, Firefox, Safari.
E-mail: Fast, digital communication method.
Popular providers: Gmail, Outlook, Yahoo.
Key ICT Tools
Tablets:
Smartphones:
Apps:
TV & Radio:
Keyboard & Mouse**
Keyboard keys: Function, Control, Navigation, Punctuation, Command.
Mouse operations: Click, Double-click, Drag & Drop, Hover.
Computers and Peripherals
Storage: USB, CD/DVD, Hard Disk; measured in bytes (KB, MB, GB, TB).
Main units: Input (Keyboard, Mouse), CPU (Processing), Output (Monitor, Printer).
CPU components: Control Unit, ALU, Memory Unit (RAM and ROM)
Peripherals: Scanner, Speaker, Webcam, Projector, Barcode Reader.
Components of Mobile Devices
Basic controls: Power, Home, Volume, Back button
Features: Bluetooth, Wi-Fi, Camera, GPS, Touchscreen, Clock.
File Operations
File operations: Create, Save, Rename, Move, Delete.
Common extensions: .txt, .doc, .jpg, .mp3.
Files & Folders: Digital organization of information.
Basic Computer Operations
Login/Logout: Secure access to user data.
Booting process: BIOS → OS loads → Desktop appears.
Software: Programs (Operating Systems like Windows, Ubuntu)
Hardware: Physical parts (CPU, Monitor)
Ports and Connections
Power port:
Audio port:
USB port:
HDMI/VGA:
Ethernet port:
ICT at Work and Home
At workplace: Used for creating documents, online transactions, calculations, media communication, etc.
At home: Used in devices like TV, smartphones, and computers for entertainment and communication.

UNIT-4: Entrepreneurial Skills-I

LEARNING OUTCOMES:

- Identify various types of business activities
- Demonstrate the knowledge of distinguishing characteristics of entrepreneurship

MAIN POINTS:

What is Entrepreneurship?

Definition: Entrepreneurship involves identifying gaps in the market and innovating to fill them with new products or services.

Entrepreneur vs. Self-employed:

- An **entrepreneur** introduces new ideas (e.g., a vendor selling healthy snacks innovatively).
- A **self-employed person** (e.g., a shopkeeper) may not innovate.

Role of Entrepreneurship

Entrepreneurs drive:

- **Economic Development**: Money circulates as businesses grow.
- **Social Development**: Job creation improves livelihoods.
- **Standard of Living**: Access to better products/services (e.g., antibacterial soap reducing illnesses).
- **Resource Optimization**: Efficient use of natural/resources.
- **Competitive Pricing**: Innovation lowers costs (e.g., cheaper mobile phones).

Qualities of a Successful Entrepreneur

Key qualities:

Patience: Persistence despite delays (e.g., Sushma took 2 years to succeed).
Positivity: Staying optimistic during failures.
Hard Work & Grit: Continuous effort (e.g., Sushma improved toy designs).
Confidence: Decisiveness and self-belief.
Creativity: Innovative solutions (e.g., Prem's 108 dosa varieties).

Openness to Experimentation: Trial-and-error learning.

Entrepreneurship vs. Wage Employment

Entrepreneurship	Wage Employment
Owns business, takes risks	Works for a salary
Solves community problems	Follows employer's instructions
Keeps profits	Earns fixed wages
Flexible/innovative	Structured role

Example: A street food vendor (entrepreneur) vs. a restaurant cook (employee).

Types of Business Activities

- **Product Business**: Tangible goods (e.g., sports shop).
- **Service Business**: Intangible offerings (e.g., cricket coaching).
- **Hybrid Business**: Mix of both (e.g., restaurant selling food and catering services).

Product vs. Service Businesses

Product Business	Service Business
Tangible (e.g., earrings)	Intangible (e.g., delivery service)
Can be stored	Perishable (e.g., haircut)
Mass-produced	Customized per customer

Examples:

Product: Sana's handmade jewelry.
Service: Pragya's bike delivery.
Hybrid: Harish's tiffin service (food + delivery).

Entrepreneurship Development Process

Steps to Start a Business:

1. **Idea Generation**: Identify a need/passion (e.g., Prem's dosa stall near a station).
2. **Resource Mobilization**: Arrange funds/materials.
3. **Market Research**: Understand customer preferences.
4. **Improvement**: Adapt based on feedback (e.g., Prem added Chinese-flavored dosas).

MULTIPLE CHOICE QUESTIONS WITH ANSWERS:

Q1. What is the primary aim of entrepreneurship?
a) To work for others
b) To follow traditional business methods
c) To avoid risks
d) To solve customer needs innovatively and earn profit

Q2. Which of the following is NOT a characteristic of an entrepreneur?
a) Risk-taking
b) Working for a fixed salary
c) Innovation
d) Self-employment

Q3. What is the key difference between an entrepreneur and a wage employee?
a) Entrepreneurs take risks; employees avoid risks.
b) Entrepreneurs work for others; employees work for themselves.
c) Entrepreneurs follow orders; employees give orders.
d) Entrepreneurs earn salaries; employees earn profits.

Q4. Which type of business involves selling physical goods?
a) Service business
b) Product business
c) Hybrid business
d) Wage employment

Q5. What quality did Sushma (the toy maker) demonstrate by improving her product based on customer feedback?
a) Patience
b) Positivity
c) Adaptability
d) Confidence

Q6. Which of these is an example of a service business?
a) A coaching center for cricket
b) A bakery selling bread
c) A shop selling sports equipment
d) A restaurant serving food

Q7. What is the first step in the entrepreneurship development process?

a) Getting money b) Understanding customer needs

c) Generating a business idea d) Improving the product

Q8. Which of these is a hybrid business?

a) A grocery store

b) A hair salon

c) A restaurant serving food and catering services

d) A car repair shop

Q9. What is "grit" in entrepreneurship?

a) Fear of failure b) Willingness to give up easily

c) Persistence despite challenges d) Avoiding risks

Q10. Which of these is a benefit of entrepreneurship?

a) Fixed monthly salary b) No risk involved

c) Freedom to pursue personal interests d) Guaranteed success

Q11. What does "profit" mean in business?

a) Total revenue earned

b) Excess earnings after deducting expenses

c) Money spent on production

d) Employee salaries

Q12. Assertion(A): A doctor works for a renowned hospital.

Reason(R): The statement given above is an example of wage employment.

(a) Both A and R are correct and R is the correct explanation of A

(b) Both A and R are correct but R is NOT the correct explanation of A

(c) A is correct but R is not correct

(d) A is not correct but R is correct

Q13. What is the role of entrepreneurs in economic development?

a) They reduce job opportunities. b) They circulate money and create jobs.

c) They avoid competition. d) They focus only on personal profit.

Q14. Which of these is a manufacturing business?

a) A wholesaler buying and selling toys b) A tutoring center

c) A delivery service d) A factory producing shoes

Q15. What is the main feature of a service business?

a) Products can be stored. b) Services are intangible.

c) Goods are transported. d) No customer interaction.

Q16. Which quality helps entrepreneurs handle failures positively?

a) Impatience b) Negativity

c) Positivity d) Inflexibility

Q17. Business is an _____ activity

a) Economic b) Relative

c) Societal d) Communication

Q18. Which of these is a trade business?

a) A bakery making bread b) A school teaching students

c) A plumber fixing pipes d) A retailer selling clothes

Q19. What is a key characteristic of entrepreneurship?

a) Risk-taking ability b) Desire to earn money only

c) Preference for a secure job d) Only making plans

Q20. Which of these is a risk in entrepreneurship?

a) Fixed income b) Competition lowering prices

c) Guaranteed success d) No customer interaction

ANSWERS :

Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10
d	b	a	b	c	a	c	c	c	c
Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20
b	a	b	d	b	c	a	d	a	b

SHORT ANSWER QUESTIONS

Q1. Define entrepreneurship.

Answer: The process of developing and running a business using innovation to meet customer needs and earn profit.

Q2. Name two qualities of a successful entrepreneur.

Answer: Patience, creativity.

Q3. What is the difference between a product and service business?

Answer: Product businesses sell tangible goods; service businesses provide intangible assistance.

Q4. How is society helping entrepreneurs in their business?

Answer: Society is helping entrepreneurs by

1. Creating needs 2. Providing raw material 3. buying/selling of items 4. making money

Q5. What is a hybrid business? Give an example.
Answer: A mix of product and service (e.g., a restaurant selling food and catering services).

Q6. List two benefits of entrepreneurship.
Answer: Freedom to pursue interests, potential for higher profits.

Q7. What is the role of entrepreneurs in job creation?
Answer: They expand businesses, requiring more employees.

Q8. What do entrepreneurs do when they run their business? Mention any two points.
Answer: I. Fulfill Customer Needs
II. Use Local Materials
III. Help Society
IV. Create Jobs
V. Sharing of Wealth
VI. Lower Price of Products.

Q9. What is "calculated risk" in entrepreneurship?
Answer: Taking informed risks after evaluating potential outcomes.

Q10. Name two types of product-based businesses.
Answer: Manufacturing (making goods), trade (buying/selling goods).

Q11. Why is positivity important for entrepreneurs?
Answer: It helps them overcome failures and stay motivated.

Q12. What is the first step in starting a business?
Answer: Generating a business idea.

Q13. How does entrepreneurship improve living standards?
Answer: By providing better products/services at competitive prices.

Q14. Give an example of a social impact by an entrepreneur.
Answer: Gulab helped village women sell handicrafts, boosting their income.

Q15. Why is entrepreneurship important?
Answer: It can create jobs, offer new products/services, and stimulate economic growth.

Q16. Raj has a small convenience store in his locality. There are many other convenience stores in the area. Yet, Raj's store survives the competition and does well. Which stage of an entrepreneur's career process can you relate this to? Explain.
Answer: This stage is the Survive stage of an entrepreneur's career process. In this stage, even if there are many entrepreneurs in the market, the new entrepreneur has to remain in a competitive market.

Q17. What is the purpose of a business plan?
Answer: To outline goals, strategies, and financial projections.
Q18. Name two challenges entrepreneurs face.
Answer: Competition, financial risks.
Q19. How can entrepreneurs attract customers?
Answer: Through innovation, quality, and marketing.
Q20. How can AI help an entrepreneur?
Answer: AI can automate tasks, analyze data, personalize customer experiences, and help with marketing.

LONG ANSWER TYPE QUESTIONS

Q1. Explain the role of entrepreneurship in economic development.
Answer: Entrepreneurs create jobs, circulate money, introduce innovations, and improve living standards by offering affordable products/services. Example: Sowmya's snack business provided income and healthy food options.

Q2. Describe the qualities of a successful entrepreneur with examples.
Answer:

- Patience: Sushma worked for 2 years before her toys succeeded.
- Creativity: Prem Ganapathy invented 108 dosa varieties.
- Risk-taking: Rahul started a dog-care business despite uncertainty.

Q3. Compare entrepreneurship and wage employment.
Answer:

- Entrepreneurship: Self-employed, takes risks, innovates, earns profits.
- Wage Employment: Works for others, fixed salary, follows instructions.
  Example: A street vendor (entrepreneur) vs. a restaurant cook (employee).

Q4. Explain the steps to start a business with an example.
Answer:

- Idea: Identify a need (e.g., healthy snacks for college students).
- Resources: Gather money/materials (e.g., small machine for snacks).
- Customer Feedback: Improve based on preferences (e.g., tastier recipes).
- Growth: Expand (e.g., sell in local shops).

Q5. Differentiate product, service, and hybrid businesses with examples.

Answer:

- Product: Tangible goods (e.g., bakery selling bread).
- Service: Intangible assistance (e.g., coaching center).
- Hybrid: Both (e.g., restaurant with dine-in and catering).

Q6. Write any six qualities for being a good entrepreneur.

Answer:

- They are confident. They believe in themselves and their abilities.
- They keep trying new ideas in their business.
- They are patient.
- They are creative and think differently about business ideas.
- They take responsibility for their actions.
- They make decisions after thinking about them.
- They work hard.
- They do not give up when they face a difficulty

Q7. Discuss the importance of customer feedback in entrepreneurship.

Answer: Feedback helps improve products/services. Example: Sushma redesigned toys after customers reported sharp edges.

Q8. What are the risks and rewards of entrepreneurship?

Answer:

- Risks: Financial loss, competition, failure.
- Rewards: Independence, potential profits, social impact. Example: Sowmya risked savings but built a successful snack business.

Q9. Explain how entrepreneurs contribute to social development.

Answer: They solve community problems (e.g., Gulab empowered women artisans), create jobs, and improve lifestyles (e.g., affordable healthcare products).

Q10. "Entrepreneurs are born, not made." Do you agree with this statement? Justify your answer.

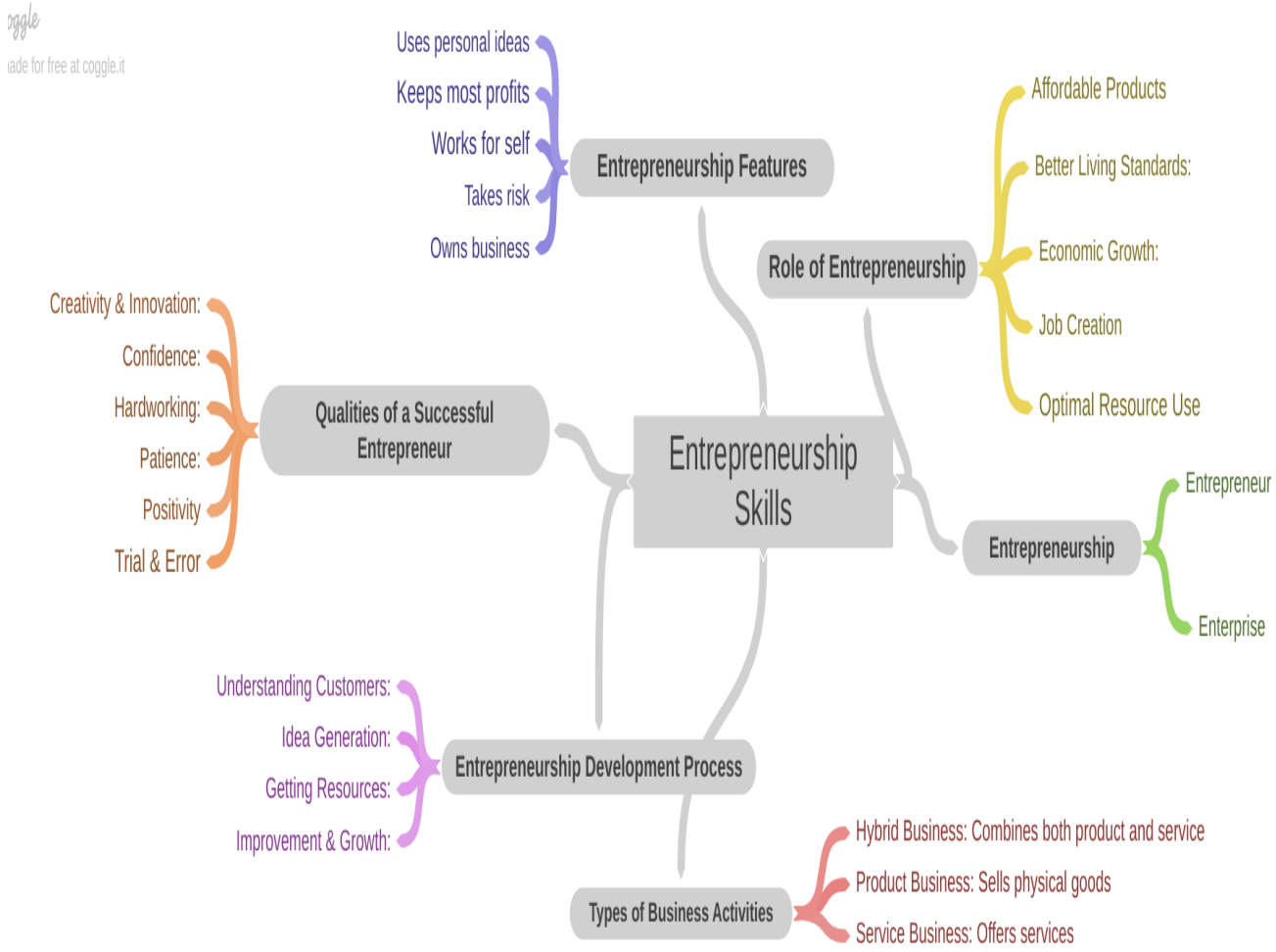
Answer: No, this is a myth/misconception about entrepreneurship. Being an entrepreneur starts with a way of thinking. One must believe that anything is possible and it shall be achieved. It starts with thinking of an idea that you want to work on, making it different.

REFERENCE/ LINKS TO RELEVANT MULTIMEDIA RESOURCES (E.G., VIDEOS, AUDIO CLIPS, ANIMATIONS) TO SUPPLEMENT LEARNING./INTERACTIVE ASSESSMENT:-

1:-
https://cbseacademic.nic.in/web_material/Curriculum26/Sec/EmployabilitySkills_IX.pdf

2:-
https://cbseacademic.nic.in/web_material/Curriculum21/publication/secondary/Employability_Skills_IX.pdf

MIND MAP


Entrepreneurship Skills
Entrepreneurship Features
Uses personal ideas
Keeps most profits
Works for self
Takes risk
Owns business
Role of Entrepreneurship
Affordable Products
Better Living Standards:
Economic Growth:
Job Creation
Optimal Resource Use
Qualities of a Successful Entrepreneur
Creativity & Innovation:
Confidence:
Hardworking:
Patience:
Positivity
Trial & Error
Entrepreneurship
Entrepreneur
Enterprise
Entrepreneurship Development Process
Understanding Customers:
Idea Generation:
Getting Resources:
Improvement & Growth:
Types of Business Activities
Hybrid Business: Combines both product and service
Product Business: Sells physical goods
Service Business: Offers services

UNIT 5: Green Skill-I

LEARNING OUTCOMES

- Understand and apply knowledge related to sustainable development, including reducing resource consumption, recycling, and managing renewable resources
- Equipping individuals with the knowledge, abilities, and attitudes necessary for a sustainable and resource-efficient society.
- Demonstrate the knowledge of green skills, green economy and green jobs.

Green skills encompass the knowledge, abilities, and attitudes necessary to live, work, and act in ways that reduce the environmental impact of human activity .i. e the skills required to build a sustainable and resource-efficient society.
The industrial development and intensive agriculture that provides the goods for our increasingly consumer-oriented society uses up large amounts of natural resources, such as water, minerals, petroleum products, wood, etc.

Natural resources

Natural resources come in many forms. It may be a solid, liquid or gas. It may also be organic or inorganic. It may also be metallic or non-metallic.

(i) Land Resources: Human beings thus, use land as a resource for production as well as residence and recreation. It is a finite resource which is subject to agricultural and non-agricultural uses

(ii) Forest Resources: A forest is a natural, self-sustaining community characterized by vertical structure created by presence of trees. Wood is used for making furniture, tool-handles, railway sleepers, matches, ploughs, bridges, boats, etc. and as a source of energy for cooking purpose and for keeping warm. Tannins, gums, drugs, spices, insecticides, waxes, honey, horns, musk ,ivory, ides, etc. are all provided by the flora and fauna of forests.

(iii) Water resources include rivers, lakes, oceans, and underground aquifers, etc. Water is a vital resource in agriculture, industrial, household and recreational and environmental activities.

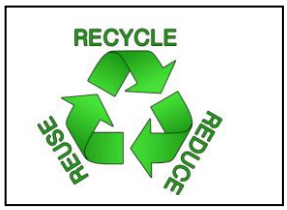
(iv) Mineral resources are non-renewable and included metals (e.g., iron, copper, and aluminium),and non-metals (e.g., salt, gypsum, clay, and, phosphates).element, such as gold, silver, diamond (carbon),and sulphur.

(v) Food Resources: Resources that are used as food, or provide food for organisms are called food resources. Plants serve as food resources for herbivores and omnivores.

(vi) Energy Resources: An energy resource is something that can produce heat and power .

Natural resources fall under the following main categories:

(a) Inexhaustible Resources: The resources which cannot be exhausted by human consumption are called inexhaustible resources. These include energy sources like solar radiation, wind power, water power and tidal power, etc.
(b) Exhaustible Resources: There are some resources, which are available in limited quantities and are going to be exhausted as a result of continuous use. For example, the stock of coal in the earth is limited and one day there will be no more coal available for our use, if we keep on using it excessively.
(c) Renewable Resources: Renewable resources are those that are constantly available (like water) or can be reasonably replaced or recovered, like vegetative lands.
(d) Non-renewable Resources: Non-renewable resources are those that cannot easily be replaced once they are destroyed For example, fossil fuels. Minerals are also non-renewable because even though they form naturally in a process called the rock cycle, it can take thousands of years, making it non-renewable.



Reduce, Reuse, Recycle
There are three Rs which you can apply for saving the environment – Reduce, Reuse and Recycle. It is a concept of the modern waste management
Reduce: Do not use what you do not need.
Reuse: Reuse the materials for other purposes, such as making pillow covers or rags out of used shirts or ladies suits.
Recycling: Recycling is reusing some components of the waste that may have some economic value. Recycling has readily visible benefits, such as conservation of resources reduction in energy used during manufacture and reducing pollution levels. Some materials, such as aluminum and steel can be recycled many times

Natural disasters
Natural disasters include floods, earthquakes, landslides, storms, etc. Our actions in exploiting natural resources for building structures, such as large dams and buildings sometimes aggravates the impact of natural calamities and disasters.

Saving the environment: What can you do?
To save our environment, we need to educate people. Education is important, as it gives people the knowledge and skills that they need to perform. Educating people

about the environment, through the environment and
for the environment will enlighten them in utilizing their knowledge and skills for saving the environment as responsible citizens.

(i) Learning about the environment: Learning about the environment focuses mainly on acquisition of knowledge and understanding of our surroundings and related issues.

(ii) Learning through the environment: The processes of learning while being engaged with environment inside and outside the classroom. It focuses on learning process, such as observation, hands-on experience, learning-by-doing, problem-solving through an exposure to the environment and learning. The direct contact with the environment provides the relevant context for acquiring knowledge, skills, aesthetic appreciation and practical experience to learning. Environment damage can be minimized by developing the skills and knowledge required for efficient resource utilization, green processes and technologies and integrating these into our businesses and daily activities.

(iii) Learning for the environment: Learning for the environment aims at the development of an informed response and responsibility towards the environment.

Conserving natural resources

Soil conservation

Soil conservation means checking soil erosion and improving soil fertility by adopting various methods.

Soil conservation can be useful for the following:

1. Maintenance of soil fertility: The fertility can be maintained by adding manure regularly as well as by rotation of crop.
2. Reforestation: Planting of trees and vegetation reduces soil erosion.
3. Terracing: Dividing a slope into several flat fields to control rapid run of water. It is practiced mostly in hilly areas.

Water conservation

Conservation and management of water are essential for the survival of mankind, plants and animals. This can be achieved by adopting the following methods:

1. Growing vegetation in the catchment areas, which will hold water in the soil and allow it to percolate into deeper layers and contribute to formation of ground water.
2. Constructing dams and reservoirs to regulate supply of water to the fields, as well as to enable generation of hydroelectricity.
3. Sewage should be treated and only the clear water should be released into the rivers.
4. Industrial wastes (effluents) should be treated to prevent chemical and thermal pollution of fresh water.
5. Judicious use of water in our day-to-day life.
6. Rainwater harvesting should be done by storing rainwater and recharging

groundwater.

Energy conservation

We use a lot of non-renewable energy resource for our needs. Since resources are limited, we need to conserve
them as much as possible.

• Use tube lights and energy efficient bulbs that save energy rather than bulbs.
• Keep the bulbs and tubes clean.
• Remove dust on the tubes and bulbs to improve lighting levels by 10 to 20%.
• Use pressure cooker to save energy required for cooking.
• Keep vessels covered with a lid during cooking. It is useful in cooking the food faster and saving energy.
• Electric items like air conditioners geysers, heaters and dryers use a lot of electrical power. Use them when necessary
• Cool hot food before putting in the refrigerator.
• Use methods of cooking that use less energy, like use a pressure cooker or solar cooker to cook food.
• Travelling in a bus or travelling in a group in a carpool is better than going alone in a car.

Food conservation

Food conservation and storage have been practiced to feed mankind in times of shortage. Food is stored in warehouses on large scale and in refrigerators at home. Food is also preserved through various methods to prevent the spoilage due to harmful bacteria and other microorganisms.

Forest conservation

Forest conservation means the retention of existing forest or the creation of new forest at the levels prescribed by the State or local authority. Participation of the community living in and around the forest is important for the success of the forest conservation programme.

Sustainable development and green economy

Sustainability is the development that satisfies the needs of the present without compromising the capacity of future generations, guaranteeing the balance between economic growth, care for the environment and social well-being.
Sustainable development includes the following:
• reducing excessive use of resources and enhancing resource conservation.
• recycling and reuse of waste materials.
• scientific management of renewable resources, especially bio-resources.
• Planting more trees.
• Green grassy patches to be interspersed between concrete buildings.

• using more environment friendly material or biodegradable material.
• use of technologies, which are environmental friendly and based on efficient use of resources.

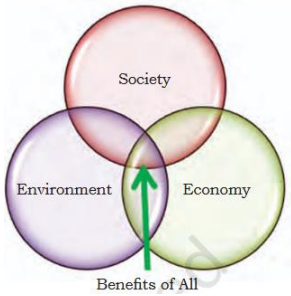
Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs),otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

The Sustainable Development Goals (SDGs)were launched at the United Nations Sustainable Development Summit in New York in September 2015,forming the 2030 Agenda for Sustainable Development. The 2030 Agenda for Sustainable Development and its17 Sustainable Development Goals (SDGs) adopted by world leaders in 2015.

Green growth

The concept of green growth aims at achieving economic growth that is socially inclusive and environmentally sustainable. The Ministry of Environment, Forest, and Climate Change, Government of India recognized green growth in its vision, wherein 'poverty eradication' along with green growth is to be seen as the focal point for green economy.



To ensure sustainable development, any activity that is expected to bring about economic growth must also consider its environmental impacts so that it is more consistent with long term growth and development. This means vehicles on the road which leads to traffic congestion, waste of time for all the commuters, and a great load of particulate matter and carbon monoxide from the exhaust of vehicles should be slowly replaced with an efficient public transport system.

Green Economy

A 'Green Economy' is a system which helps in economic growth while at the same time, taking care of the environment.

The term 'Green Economy' was first coined in a 1989 report for the Government of the United Kingdom by a group of leading environmental economists, entitled Blueprint for a Green Economy. UNEP has defined the green economy as "one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.

Components of a Green Economy

- Renewable energy(Renewable energy from renewable resources like wind, water, sun, earth, biomass, etc)

- Green building(Green buildings are buildings that cause minimum damage to the environment during their construction)
- Sustainable transport-Sustainable means what is good for the economy as well as the future of the environment
- Water management -We need to avoid water pollution and not waste water
- Waste management -All wastes result in loss of resources and increases land, water and air pollution

Green Skills:

Values and attitudes required to live in, develop and support a sustainable and resource-efficient society.

Some of the areas in which green skills contribute to the sustainable development are as follows:

• using renewable energy (example, using solar power and wind energy)
• water and waste management
• rain water harvesting
• conserving energy
• reducing pollution

Green Consumer Day is celebrated on September 28 of each year. It is a day when people celebrate the earth and bring about awareness on how small actions can help earth to remain green and clean

Green jobs

A ‘green job’ is employment in any industry that contributes to preserving or restoring environmental quality in that sector and allowing for sustainable development. It includes jobs that help protect ecosystems and biodiversity and reduce energy, materials and water consumption through high efficiency strategies.

Green projects:

Many people and organisation are concerned and motivated about doing something to save the environment. They are implementing green projects in areas like waste management, energy conservation, green sanitation, bio fuel use, green buildings, etc.

Examples of green projects

- Solid Waste Management by 'Swachh Cooperative'
- Modern Chulha of ‘Society of Development and Environment Protection’
- Bio-toilet by ‘Green Solution Foundation’

.

MULTIPLE CHOICE QUESTIONS

Q1.Which of the following are non-renewable resources? (Choose all options that apply)

(a) Coal (b) Diesel
(c) Sun (d) Water

Q2.Which of the following is an example of renewable resources?

(a) Coal (b) Solar energy
(c) CNG (d) Petroleum

Q3.Which of the following options describes a green economy correctly? A green economy

(a) uses less resources (b) uses more resources
(c) wastes less items (d) wastes more items

Q4.which of the following is/are the elements of green economy

(a) employment creation (b) energy efficiency
(c) preservation of natural resources (d) All of the above

Q5.In your house identify which of the waste has an excellent recycling potential?(CBQ)

(a) Vegetable scrap (b) Rubber
(c) Plastic (d) Metal

Q6.What is the primary cause of environmental pollution due to modern agriculture?

a) Use of hybrid crops
b) Overuse of chemical fertilisers and pesticides
c) Organic farming
d) Crop rotation

Q7.What is the primary cause of air pollution in urban areas?

a) Tree plantation b) Vehicle exhaust fumes
c) Rainwater harvesting d) Organic farming

Q8.Which of the following is a key component of a green economy?

a) Excessive use of fossil fuels b) Renewable energy
c) Deforestation d) Increased plastic waste

Q9.What is the role of a green consumer?

a) Purchasing only plastic products
b) Buying products harmful to the environment
c) Choosing eco-friendly products
d) Ignoring sustainability

Q10.What are green skills primarily used for?

a) Increasing pollution
b) Promoting unsustainable practices
c) Balancing economic growth with environmental conservation
d) Ignoring climate change

Q11.Which of the following is an example of a green job?

a) Coal miner b) Plastic manufacturer
c) Organic farmer d) Diesel vehicle engineer

Q12.What does the "3R" principle stand for in waste management?

a) Reduce, Reuse, Recycle b) Remove, Replace, Rebuild
c) Reject, Return, Repeat d) Read, Remember, Recall

Q13.Which program by the Indian government focuses on skill development for green jobs?

a) Make in India

b) Green Skill Development Programme (GSDP)

c) Digital India

d) Swachh Bharat Mission

Q14.What is the purpose of a bio-toilet?

a) Increase water wastage

b) Convert human waste into usable water

c) Promote plastic use

d) Encourage deforestation

Q15.Which sector offers green jobs like solar technicians and wind energy professionals?

a) Agriculture b) Energy

c) Retail d) Tourism

Answers:MCQ

Q1 .(a) and (b)	Q2.(b)	Q3.(a) and (c)	Q4.(d)	Q5.(a)
Q.6 (b)	Q.7 (b)	Q. 8 (b)	Q.9 (c)	Q.10 (c)
Q.11 (c)	Q.12 (a)	Q.13 (b)	Q.14 (b)	Q.15 (b)

SHORT ANSWER TYPE QUESTIONS

Q1.Describe any three methods of water conservation.
Answer:
Three methods of water conservation are as follows:
(a) Growing vegetation in catchment areas to hold in the soil.
(b) Rainwater harvesting to store rainwater.
(c) Prevention of throwing industrial wastes into sources of water.

Q2.State any three ways by which we can save energy.
Answer:
The ways to save energy are as follows:
(a) Use pressure cooker to save energy required for cooking.
(b) Using electric items like AC, geyser only when necessary as they use lot of electricity.
(c) Use renewable sources of energy wherever possible like using solar cooker, solar heater

Q3.Give two examples of green skills that you can start learning from now.
Answer:
Two examples of green skills that can be learnt:
(a) To reduce use of non-renewable sources of energy and use renewable sources wherever possible, e.g. to study in daytime use more of natural light instead of tube light.
(b) To segregate household waste for proper waste management, e.g. keeping two separate dustbins for collection of dry and wet waste.

Q4.What are the three Rs in waste management, and how do they contribute to environmental conservation?
Answer:
Reduce, Reuse, Recycle-these practices minimize waste generation, conserve resources, and reduce environmental impact.
Q5.What does sustainable development aim to achieve?
Answer:
Sustainable development aims to meet present needs without compromising the ability of future generations, balancing economic growth, environmental care, and social well-being.

Q6.How is a ‘green job’ defined?
Answer:
A ‘green job’ contributes to environmental preservation, sustainability, and includes roles in sectors like agriculture, manufacturing, research, and education focused on eco-friendly practices.

Q7.Define Green economy. Explain its two components.
Answer:
Green economy is defined as the one that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities.

Two components of green economy are as follows:
1. Using the land resources to meet the requirement of people without causing damage to the environment.
2. Develop sustainable transport system that will cost less, help more people to move quickly and cause less or no damage to the environment.

Q8.How can green jobs be developed in construction and forestry?
Answer:
Green jobs include jobs that help protect the ecosystem and diversity. In construction the areas in which green jobs can be developed are in planning, design, manufacturing of buildings, lighting appliances etc. Green jobs in this sector are green builders, green design professionals, green workers.

In forestry the areas in which green jobs can be developed are in reforestation, afforestation projects, agroforestry and vertical farming. Green jobs in this sector are of natural scientists.

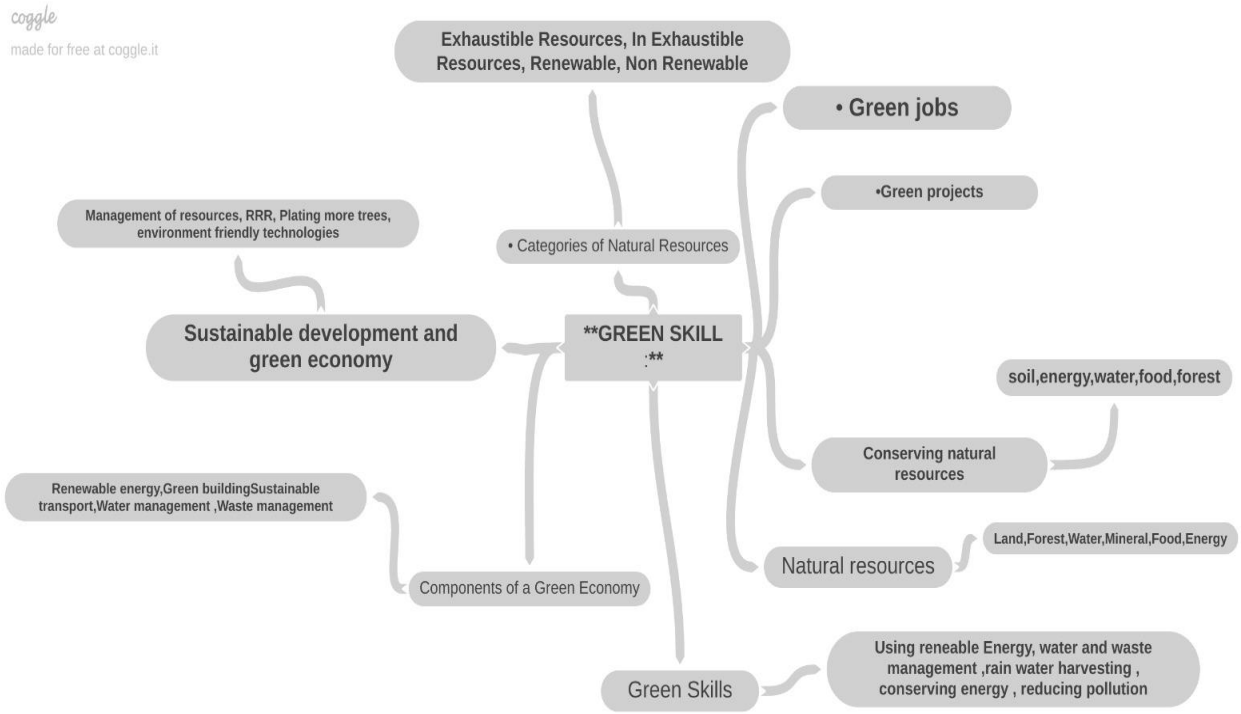
Read the statements marked as Assertion (A) and Reason (R). Choose the correct option:

I. Both A and R are correct and R is the correct explanation of A
II. ii. Both A and R are correct but R is not the correct explanation of A.
III. iil. A is correct but R is not correct.
IV. iv. A is not correct but R is correct.

Q9 Assertion (A) Green economy is an effort of the whole world to create a healthy planet.
Reason (R).It uses alternative ways of growth and development that improve quality of life of people through sustainable development.
Q10 Assertion (A):Waste management seeks to minimize environmental degradation.
Reason (R).It helps to manage the waste by adopting 3Rs

Answers: 9-I 10-I

MIND MAP


coggle
made for free at coggle.it
Exhaustible Resources, In Exhaustible Resources, Renewable, Non Renewable
• Green jobs
•Green projects
Management of resources, RRR, Plating more trees, environment friendly technologies
• Categories of Natural Resources
Sustainable development and green economy
GREEN SKILL :
soil,energy,water,food,forest
Conserving natural resources
Renewable energy,Green buildingSustainable transport,Water management ,Waste management
Land,Forest,Water,Mineral,Food,Energy
Natural resources
Components of a Green Economy
Using reneable Energy, water and waste management ,rain water harvesting , conserving energy , reducing pollution
Green Skills

PART-B – SUBJECT SPECIFIC SKILLS

Unit 1: AI Reflection, Project Cycle and Ethics

LEARNING OUTCOMES:

Learners will be able to

- Identify and appreciate Artificial Intelligence and describe its applications in daily life.
- Relate, apply and reflect on the Human-Machine Interactions to identify and interact with the
    - three domains of AI: Data, Computer Vision and Natural Language Processing and Undergo
    - assessment for analyzing their progress towards acquired AI-Readiness skills.
- Get familiar and motivated towards Artificial Intelligence and Identify the AI Project Cycle framework.
- Learn problem scoping and ways to set goals for an AI project and understand the iterative nature of problem scoping in the AI project cycle.
- Identify stakeholders involved in the problem scoped.
- Understand the iterative nature of problem scoping for in the AI project cycle.
- Brainstorm on the ethical issues involved around the problem selected.
- Foresee the kind of data required and the kind of analysis to be done.
- To understand the purpose of Data Visualization
- Use various types of graphs to visualize acquired data.
- Identify data requirements and find reliable sources to obtain relevant data.
- Understand various evaluation techniques.

Introduction to AI

Artificial intelligence (AI) refers to the capability of computational systems to perform tasks typically associated with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making. The term "artificial intelligence" was coined by John McCarthy in 1956.

Applications of AI

Advanced web search engines (e.g., Google Search); recommendation systems (used by YouTube, Amazon, and Netflix), virtual assistants (e.g., Google Assistant, Siri, Alexa), autonomousvehicles (e.g., Waymo); generative and creative

tools(e.g., ChatGPT , Deepseek, Grok,AI art) ,Health Care (AI driven medical imaging),Social media(personalized recommendations, content moderations, content creation),Banking(Fraud and Risk detection) ,Agriculture(AI powered tools to optimize resources use and crop management),Space explorer(safe landing of Chandrayan-III on lunar south pole).

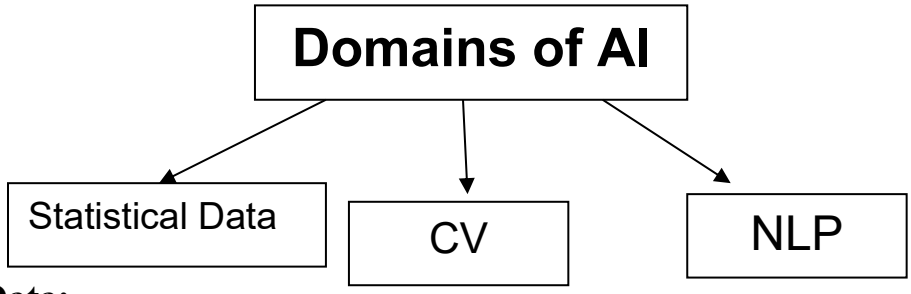
How to make machine Intelligent?

When a machine can learn, reason and adapt.

DATA+ALGORITHM=AI MACHINE

Domains of AI

specialized areas within artificial intelligence that deal with specific problems, techniques, and applications.



Statistical Data:

Statistical Data refers to statistical techniques to analyze, interpret and draw insights from numerical/tabular data

- It is the backbone of AI here the data is called bigdata (voluminous data).
- Data is derived from various sources private as well as public.
- The data is processed by analyzing patterns and trends to speculate future predictions.

Computer Vision (CV): Computer Vision, is an AI domain works with videos and images enabling machines to interpret and understand visual information.

- It uses machine learning and neural networks to enable computers and systems to understand and interpret the visual world. It replicates the complexity of human vision.
- Computer vision enables machines to "see" and interpret images, much like humans.

Natural language processing (NLP)

AI domain focused on textual data enabling machines to comprehend, generate, and manipulate human language. i.e. computers to understand human language, whether written, spoken, or even scribbled.

Some AI Applications

- **Face Lock in Smartphones**

Smartphones nowadays come with the feature of face locks in which the smartphone's owner can set up his/her face as an unlocking mechanism for it.

- **Smart assistants**

Smart assistants like Apple's Siri and Amazon's Alexa recognize patterns in speech, then infer meaning and provide a useful response.

- **Fraud and Risk Detection**

Finance companies were fed with bad debts and losses every year. However, they had a lot of data which used to get collected during the initial paperwork while sanctioning loans.

- **Medical Imaging**: For the last decades, computer supported medical imaging

application that has been a trustworthy help for physicians. It doesn't only create and analyze images, but also becomes an assistant and helps doctors with their interpretation.

AI Project Cycle

AI Project Cycle is a structured approach to developing AI solutions, involving six key stages:

● Problem Scoping
● Data Acquisition
● Data Exploration
● Modeling
● Evaluation
● Deployment

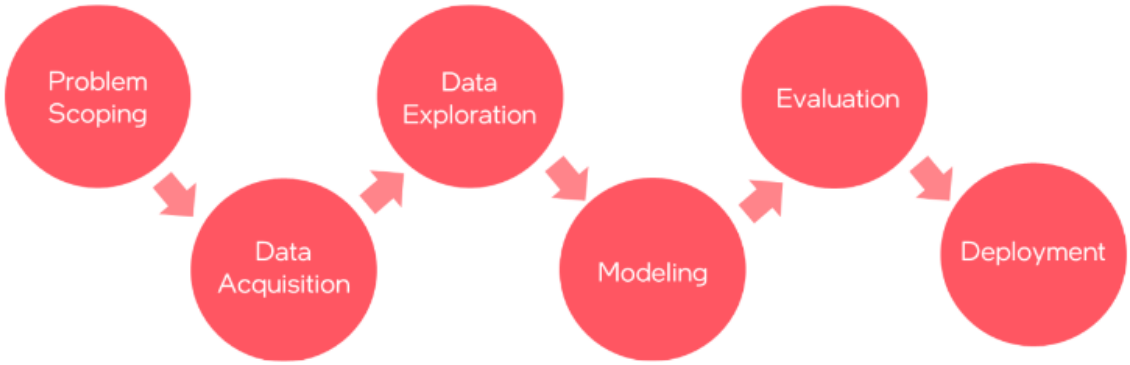
Use of AI Project Cycle

AI project cycle is the cyclical process followed to complete an AI project.

AI project cycle helps us:

- to understand the process

- to create better AI projects easily
- to create AI projects faster



1. **Problem Scoping**: This initial stage involves clearly defining the problem you're trying to solve, setting project goals, and identifying the key stakeholders, identifying existing measures, identifying ethical issue which will influence the project.

4W frameworks:

Who: Stakeholders (who are facing the problems and wants a solutions)

What: What is the actual problem. To collect evidence to prove that the problem actually exists.

Where: Context/situation/location of the problem.

Why: How the solution will be benefited to the society

Problem Statement Template

The Problem Statement Template helps us to summarize all the key points into one single Template so that in future, whenever there is a need to look back at the basis of the problem, we can take a look at the Problem Statement Template and understand the key elements of it.

Problem Statement Template with space to fill details according to your Goal:

Our	[stakeholders]	**Who**
has a problem that	[issue, problem, need]	**What**
when / while	[context, situation].	**Where**
An ideal solution would	[benefit of solution for them]	**Why**

2. Data Acquisition: (Acquiring Data from reliable sources)
In this stage, you collect the relevant data that will be used to train and evaluate your AI model.
Types of Data:
Training Data: collecting and preparing the data needed to train the AI model.
Testing Data: Testing data is a separate dataset used to evaluate the performance of attained model after it has been developed.

Various sources for data acquisition:

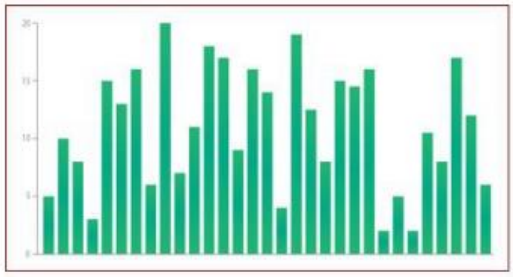
- Data can be acquired from a wide range of sources, including physical sensors, online databases, social media platforms, and even by purchasing datasets from external vendors.
- These sources can be categorized into physical sensors, online databases, and data warehouses.
- **Physical Sensors and Transducers**: These directly measure physical phenomena like temperature, pressure, and movement.
- **Online Databases**: This includes structured data stored in relational databases, APIs (Application Program Interface), and flat files.
- **Data Warehouses**: These are centralized repositories that store data from various operational systems, databases, and external sources like partner systems, IoT devices, weather apps, and social media.
  Sharing/Exchanging Data: Data can be shared or exchanged with other organizations or entities.
  Public Datasets: Free datasets from government or research

repositories can be used.

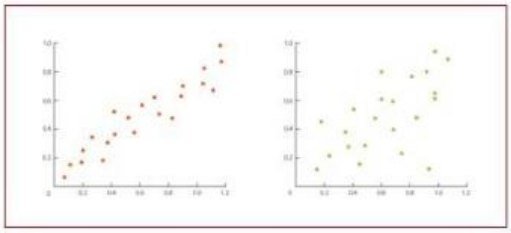
Internal Databases: Organizations can access data from their own proprietary databases or internal sources.

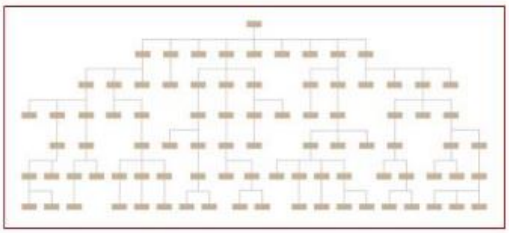
IoT Devices: Data can be acquired from IoT devices connected to operational systems.

3. Data Exploration: This involves analyzing and visualizing the collected data to gain insights, understand its characteristics, and identify potential issues.


Bar Chart


Line Chart


Scatter Plot


Tree Diagram

Data visualization techniques which you learnt from :-

https://datavizcatalogue.com

Steps in data exploration:

Data Collection: Gathering data from various sources.

Data Cleaning: Addressing missing values, duplicates, and inconsistencies.

Data Transformation: Converting data into a suitable format for analysis.

Data Visualization: Using graphs, charts, and other visuals to explore patterns and relationships.
Statistical Analysis: Applying statistical techniques to analyze the data.
Feature Selection: Identifying relevant features for modeling.
Documentation: Documenting the data exploration process and findings

4. Modeling:

In this module, progress from data exploration to AI modeling, learning about key distinctions between Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL). The module introduces two approaches to AI modeling: Rule-Based and Learning-Based

This is the core stage where you develop and train the AI model to learn patterns from the data and make predictions or decisions using algorithms and mathematical frameworks to solve a defined problem

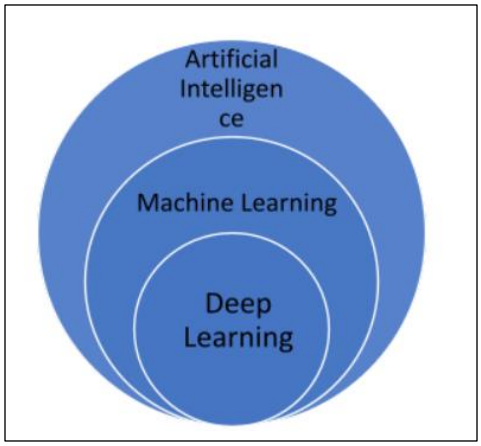
AI, ML & DL

AI (Artificial Intelligence)-refers to any technique that enables computers to mimic human intelligence. An artificially intelligent machine works on algorithms and data fed to it and gives the desired output.

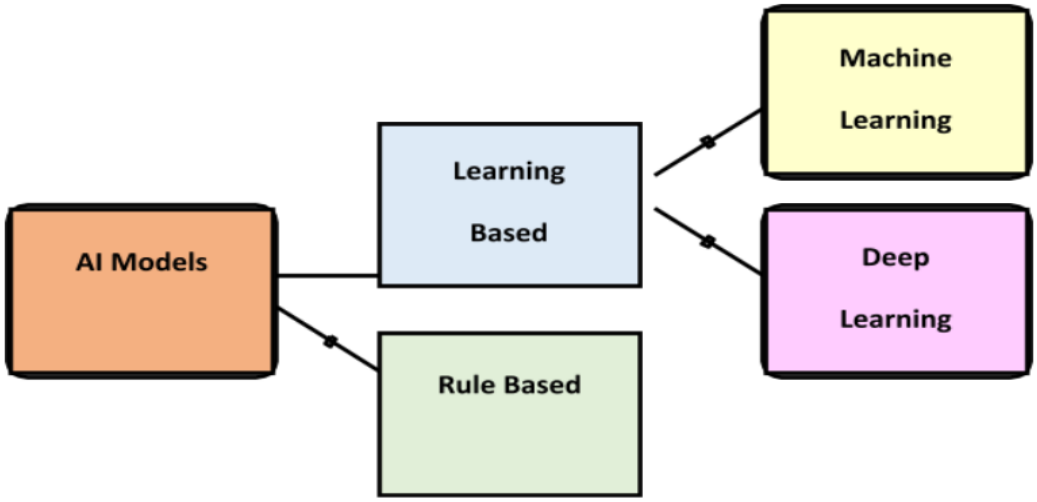
ML (Machine Learning) - Enables machines to improve at tasks with experience. The machine here learns from the new data fed to it while testing and uses it for the next iteration. It also takes into account the times when it went wrong and considers the exceptions too.

DL (Deep Learning)- Enables software to train itself to perform tasks with vast amounts of data. Since the system has got huge set of data, it is able to train itself with the help of multiple machine learning algorithms working altogether to perform a specific task.

"Artificial Intelligence is the umbrella term which holds both Deep Learning as well as Machine Learning. Deep Learning, on the other hand, is the very specific learning approach which is a subset of Machine Learning as it comprises of multiple Machine Learning algorithms."



Generally, AI models can be classified as follows:



Rule Based Approach

Refers to the Al modeling where the rules are defined by the developer. The machine follows the rules or instructions mentioned by the developer and performs its task accordingly.

For example, we have a dataset which tells us about the conditions on the basis of which we can decide if child can go out to play golf or not.

The parameters are: Outlook, Temperature, Humidity and Wind

Rule Based AI Model

Predictors				Target
Outlook	Temp	Humidity	Windy	Play Golf
Rainy	Hot	High	False	No
Rainy	Hot	High	True	No
Overcast	Hot	High	False	Yes
Sunny	Mild	High	False	Yes
Sunny	Cool	Normal	False	Yes
Sunny	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Rainy	Mild	High	False	No
Rainy	Cool	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Rainy	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Sunny	Mild	High	True	No

Learning Based Approach

Refers to the Al modelling where the machine learns by itself. Under the Learning Based approach, the Al model gets trained on the data fed to it and then is able to design a model which is adaptive to the change in data.

1. **Supervised Learning:**

This type of learning uses labeled data, where each input comes with a corresponding correct output, to train a model

Examples:

Image classification: Training a model to identify different objects in images, like cats, dogs, or cars.

Spam detection: Training a model to distinguish between spam and legitimate emails.

Medical diagnosis: Training a model to identify different types of tumors in medical images.

Predicting stock prices: Training a model to predict the future price of a stock based on historical data.

2. **Unsupervised Learning:**

This type of learning uses unlabeled data to discover patterns and relationships within the data.

Examples:

Customer segmentation: Grouping customers with similar purchasing behaviors for targeted marketing.

Anomaly detection: Identifying unusual or suspicious patterns in data, such as fraudulent transactions.

Feature extraction: Identifying the most important features in a dataset for analysis.

Benefits of Learning-Based Approach

Flexibility: Can handle a wide range of problems and adapt to new situations.

Adaptability: Can improve its performance over time with more data.

Pattern Recognition: Can identify complex patterns and relationships in Data.

5. Evaluation:

This final stage assesses the performance of the trained model by comparing its predictions to actual results and evaluating its reliability. Evaluation is the process of understanding the reliability of any AI model, based on outputs by feeding test dataset into the model and comparing with actual answers. There can be different Evaluation techniques, depending of the type and purpose of the model.

Purpose of Evaluation

Understanding Model Performance:

Evaluation helps determine how well the AI model can solve the problem it was designed for.

Identifying Strengths and Weaknesses:

By analyzing the model's performance, you can identify areas where it excels and areas where it needs improvement.

Guiding Model Refinement:

The evaluation results can inform further adjustments to the model, such as retraining with different algorithms or adjusting parameters.

Key Evaluation Metrics:

Accuracy:

Measures the overall correctness of the model's predictions, encompassing both true positives and true negatives.

Precision:

Measures how well the model avoids false positives (incorrectly identifying something as positive when it's not).

Recall (Sensitivity):

Measures how well the model correctly identifies all positive cases, avoiding false negatives (missing positive cases).

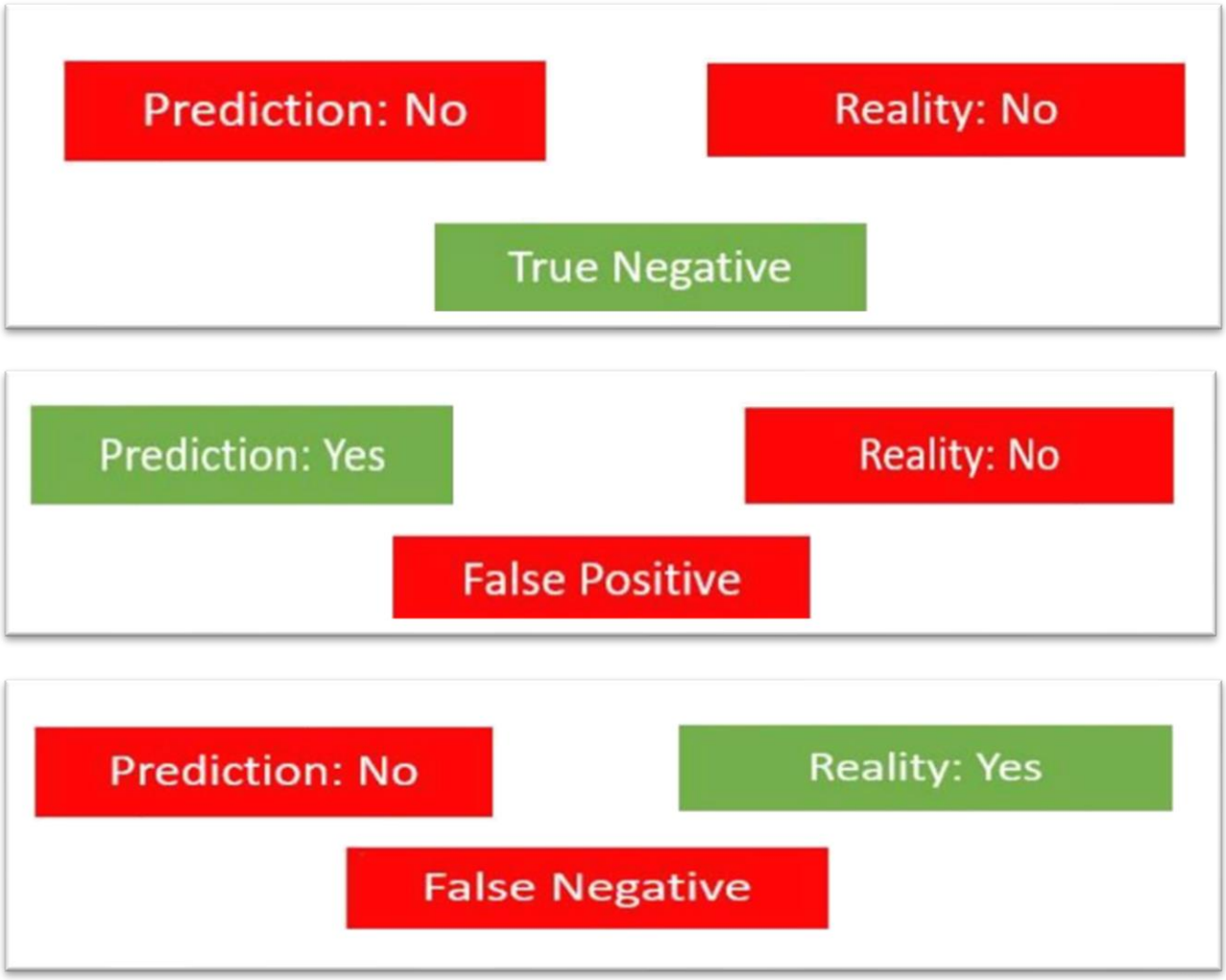
F1-score:
Combines precision and recall, providing a balanced view of the model's performance, especially useful when dealing with imbalanced datasets.

Model Evaluation Terminologies

Imagine that you have come up with an AI based prediction model which has been deployed in a forest which is prone to forest fires. Now, the objective of the model is to predict whether a forest fire has broken out in the forest or not

Here we have two conditions (Prediction and Reality)

Prediction (**output** which is given by the machine) and Reality (**real scenario** in the forest when the prediction has been made)



- True Positives (Correct Positive Predictions)
- True Negatives (Correct Negative Predictions)
- False Positives (Incorrectly Predicted Positives)
- False Negatives (Incorrectly Predicted Negatives)

6.Deployment

Deployment as the final stage in the AI project cycle where the AI model or solution is implemented in a real-world scenario.

Key steps involved in the deployment process:

a. Testing and validation of the AI model

b. Integration of the model with existing systems

c. Monitoring and maintenance of the deployed model.

Some examples of successful AI projects that have been deployed in various industries, such asself-driving cars, medical diagnosis systems, and chatbots.

AI ETHICS

Refers to the principles that guide the development and use of AI systems to ensure they are beneficial, safe, and responsible. These principles consider fairness, transparency, accountability, privacy, security, and potential societal impacts of AI.

Difference between ethics and morals:

- Ethics generally refers to societal rules and standards, while morals are more about personal beliefs and values
- Ethics are external, while morals are internal (Ethics are often enforced by legal or organizational sanctions, while morals are more personal).

Examples:

Moral: A business owner choosing to donate a portion of their profits to charity because they believe in giving back to the community.

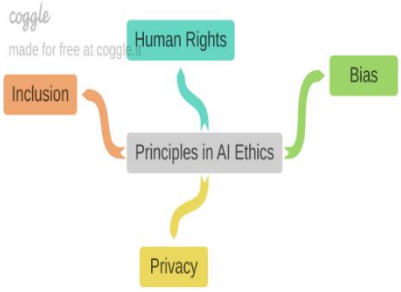
Ethics: A business owner to donate some percentage of his profit under CSR (Company Social Responsibility)

Ethics can include avoiding bias, ensuring privacy of users and their data, Inclusion and environmental risks.

Ethics vs Morals

Morals	Ethics
• The beliefs dictated by our society. • Morals are not fixed and can be different for different societies **Examples:** • Always speak the truth • Always be loyal • Always be generous	• The guiding principles to decide what is good or bad. • These are values that a person themselves chooses for their life **Examples:** • Is it good to speak the truth in all situations? • Is it good to be loyal under all circumstances? • Is it necessary to always be generous?

Principles in AI Ethics



To make AI better, we need to identify the factors responsible for it.
The following principles in AI Ethics affect the quality of AI solutions
Here are a few things that you should take care of :

Human Rights

- Does your AI take away Freedom?
- Does your AI discriminate against People?
- Does your AI deprive people of jobs?
- What are some other human rights which need to be protected when it comes to AI?

Bias

- Does your data equally represent all the sections of the included populations?
- Will your AI learn to discriminate against certain groups of people?
- Does your AI exclude some people?
- What are some other biases that might appear in an AI?

Privacy

- Does your AI collect personal data from people?
- What does it do with the data?
- Does your AI let people know about the data that it is collecting for its use?
- Will your AI ensure a person's safety? Or will it compromise it?
- What are some other ways in which AI can breach someone's privacy?

Inclusion

- Does your AI collect personal data from people?
- What does it do with the data?
- Does your AI let people know about the data that it is collecting for its use? Will your AI ensure a person's safety? Or will it compromise it?
- What are some other ways in which AI can breach someone's privacy?

Ethical scenarios faced while building AI solutions:

Scenario 1: If a driverless car finds someone crossing the road, takes a turn to avoid hitting the person and instead smashed the car in a wall / tree nearby causing serious injury to the passengers, is it a fault in the development on moral ground.

Scenario 2: If any Automated or Driverless Car hits someone standing in the middle of a road, who needs to be held responsible; whom should be penalized

AI bias

The biased mentality of the developers may result in the presence of bias in the AI System. Bias might not be negative always but it may reflect the social norms and common facts.

AI bias can develop due to the data used to train the AI

Examples of AI bias:

All the virtual assistants have a female voice.

- If searching is done for Salons on Google, the resultant list mostly contains female salons.
- Searching for images of Nurse gives the pictures of female nurses mostly.

Some recent examples of AI bias?

- Racial AI Bias in the U.S. Healthcare

They discovered that a widely used healthcare algorithm, affecting over 200 million patients in U.S. hospitals, significantly favored white patients over Black patients when predicting who needed extra medical care.

AI Access

- AI Access refers to the ability to securely and appropriately use artificial intelligence tools and applications.
- Since AI Systems are emerging technology and expensive, all cannot get access to AI and get benefitted. Ex-people belong to EWS may not be benefitted from AI
- AI may create unemployment if not implemented carefully and with compassion.

MULTIPLE CHOICE QUESTIONS

Q1. What is one purpose of AI in healthcare?

a) To replace doctors b) To assist in the interpretation of medical images

c) To automate physical therapy d) To develop new medications

Q2. What is the function of smart assistants like Alexa and Siri?

a) To answer all mathematical questions

b) To recognize speech patterns and provide responses

c) To function as a calculator

d) To guide physical robots

Q3. In AI, what does the term "modelling" refer to?

a) Designing a physical model

b) Creating algorithms that can predict outcomes

c) Drawing pictures

d) Painting a model

Q4. What is the purpose of the AI Project Cycle?

a) To predict future trends in technology

b) To guide AI development from problem scoping to deployment

c) To monitor AI performance after deployment

d) To collect data from the internet

Q5. Which stage in the AI Project Cycle involves gathering data?

a) Problem Scoping b) Data Acquisition

c) Modelling d) Evaluation

Q6. What is problem scoping in AI?

a) Defining the problem that AI is supposed to solve

b) Testing the AI model

c) Training data collection

d) Evaluating AI performance

Q7. Which type of AI approach adapts its algorithms based on new data?

a) Rule-Based AI b) Learning-Based AI

c) Fixed AI d) Reactive AI

Q8. What does the term "evaluation" mean in AI?

a) Writing new algorithms
b) Testing AI models against a dataset to check accuracy
c) Creating data features
d) Monitoring users

Q9. What is the final stage of the AI Project Cycle?
a) Problem Scoping
b) Data Acquisition
c) Evaluation
d) Deployment

Q10.Spam filter is an application of _____.
a) Natural Language Processing
b) Data Science
c) Computer Vision
d) Segmentation

Q11.Searching for a Chef's photo in the web browser mostly give men's images. This is an instance of _____.
a) AI Access b) AI Bias c) AI Domain d) AI Ethics

Q12.Choose the five stages of AI project cycle in correct order:
a) Evaluation -> Problem Scoping -> Data Exploration -> Data Acquisition -> Modelling->Deployment
b) Problem Scoping -> Data Exploration -> Data Acquisition -> Evaluation -> Modelling->Deployment
c) Data Acquisition -> Problem Scoping -> Data Exploration -> Modelling ->Evaluation->Deployment
d) Problem Scoping -> Data Acquisition -> Data Exploration -> Modelling ->Evaluation->Deployment

Q13.Which of the following is not a correct method of Data Collection?
a) Survey b) Prediction c) Observation d) API

Q14.Which one of these is a game that uses AI to understand language?

a) Quick Draw b) Semantris c) Tetris d) Chess

Q15.How is AI used in self-driving cars?

a) It generates energy

b) It processes visual data and makes driving decisions

c) It repairs the engine

d) It calculates fuel efficiency

Q16.Which of the following AI domains involves learning from data to improve over time?

a) Computer Vision b) Deep Learning

c) Natural Language Processing d) Data Mining

Q17.What does it mean for an AI model to "learn"?

a) It memorizes data

b) It improves its performance using data and experience

c) It processes large amounts of information

d) It executes tasks faster than humans

Q18.What should you check before using personal data in AI?

a) If it's from a private company

b) If it is publicly available or obtained ethically

c) If the data is stored in a database

d) If it was collected automatically

Q19 and 20 are ASSERTION AND REASONING based questions.

Mark the correct choice as

(a) Both A and R are true and R is the correct explanation for A

(b) Both A and R are true and R is not the correct explanation for A

(c) A is True but R is False

(d) A is false but R is True

Q19. Assertion(A) : Rule based AI model is a static model.

Reasoning(R): Rule based model can evolve over changing data set.

Q20. Assertion(A): Dimension Reduction is used in higher dimension problems.

Reasoning(R): Reducing dimension of a problem causes huge data loss.

Answers:

1-b	**2-b**	**3-b**	**4-b**	**5-b**	**6-a**	**7-b**	**8-b**	**9-d**	**10-a**
11-b	**12-d**	**13-b**	**14-b**	**15-b**	**16-b**	**17-b**	**18-b**	**19-c**	**20-b**

SHORT ANSWER QUESTIONS

Q1. How can AI be used as a tool to transform the world into a better place?

Ans: AI can be used to make the world better by improving productivity, healthcare, education, and accessibility. AI systems can predict and solve critical problems like climate change, help optimize resource use, enhance medical diagnosis with Computer Vision and NLP, improve personalized education, and increase efficiency in various industries. AI can also aid in monitoring environmental changes and managing large-scale social challenges like poverty and food security.

Q2. Applications in smartphones that widely use Computer Vision:

- Face Unlock
- Google Lens
- Augmented Reality filters in social media apps (like Snapchat, Instagram)
- Barcode and QR code scanners
- Image search in photo galleries.

Q3. Difference between the three domains of AI with respect to the types of data they use:

- Natural Language Processing (NLP): Works with textual and spoken data to understand, generate, and manipulate human language.
- Computer Vision (CV): Works with visual data, including images and videos, to help machines interpret and understand visual content.
- Data Science: Works with numerical, statistical, and structured data to identify patterns and draw insights from large datasets.

Q4. How is an AI project different from an IT project?

An AI project focuses on building models that can learn and improve over time based on data, whereas an IT project is more static and involves creating software systems based on fixed rules and requirements. AI projects emphasize adaptability and continuous learning, while IT projects prioritize system functionality and efficiency.

Q5. Name various methods for collecting data.

- Surveys: Used in customer sentiment analysis.
- Sensors: Used in smart agriculture to monitor environmental conditions.
- Web scraping: Used for gathering publicly available data from websites (e.g., market trends).
- APIs: Used in financial applications to collect real-time stock market data.

Q6. What must you keep in mind while collecting data so it is useful?

Ensure that the data is relevant, accurate, unbiased, and obtained from reliable sources. The data should also comply with privacy laws and be suitable for training AI models.

Q7. Explain Data Privacy:

Data privacy refers to the ethical handling of individuals' personal data. It involves ensuring that personal information is collected, stored, and used responsibly, with the consent of the individual, and safeguarding against misuse. AI systems that handle personal data, such as biometric information or social media activity, must follow strict privacy regulations to protect users' rights.

Q8. How should AI system maintain privacy of user data?

a) Restrict data collection to what is strictly necessary.

b) Secure data by identifying risk, stop misuse or leakage of data with encryption and password protection.

c) Take permission from user while collecting their personal information and clearly state their usage. Provide control to user over their individual information.

Q9. Difference between Rule base approach and Learning Based Approach

Rule base approach	Learning Based Approach
Refers to the Al modelling where the rules are defined by the developer. The machine follows the rules or instructions mentioned by the developer and performs its task accordingly.	Refers to the Al modelling where the machine learns by itself. Under the Learning Based approach, the Al model gets trained on the data fed to it and then is able to design a model which is adaptive to the change in data

Q10. Explain the concept of 4W's problem canvas

4W Problem Canvas is a Problem Scoping framework prepared to understand scope of the project and prepare Problem Statement Template. It has 4 components – who, what, where, why

Who are the stakeholders facing the problem and need solution?

What is the nature of the problem and its severity?
Where is the Location, Context, Situation and Frequency of the problem?
Why is the problem occurring?

LONG ANSWER TYPE QUESTIONS

Q1. Define AI, ML and DL. Also state the relation among them.

AI- refers to any technique that enables computers to mimic human intelligence. An artificially intelligent machine works on algorithms and data fed to it and gives the
desired output.

ML- Enables machines to improve at tasks with experience. The machine here learns from the new data fed to it while testing and uses it for the next iteration.

It also takes into account the times when it went wrong and considers the exceptions too.

DL- Enables software to train itself to perform tasks with vast amounts of data. Since the system has got huge set of data, it is able to train itself with the help of multiple machine learning algorithms working altogether to perform a specific task

AI > ML > DL

Q2. Training Data VS Testing Data

Training Data	Testing Data
i. Used to train the machine learning model	i. Used to test performance of a trained model
ii. Input to the system	ii. Outcome from a system
iii. Larger data set for better knowledge and accuracy	iii. Smaller data set obtained after evaluation

Q3. What do you mean by AI access explain with Example

AI Access

- AI Access refers to the ability to securely and appropriately use artificial intelligence tools and applications.

- Since AI Systems are emerging technology and expensive, all cannot get access

to AI and get benefitted. Ex-people belong to EWS may not be benefitted from AI

- AI may create unemployment if not implemented carefully and with compassion.

Q4. Explain Principle of AI Ethics

To make AI better, we need to identify the factors responsible for it. The following principles in AI Ethics affect the quality of AI solutions.

Here are a few things that you should take care of

Human Rights

- Does your AI take away Freedom?
- Does your AI discriminate against People?

Bias

- Does your data equally represent all the sections of the included populations?
- Will your AI learn to discriminate against certain groups of people?

Privacy

- Does your AI collect personal data from people?
- What does it do with the data?

Inclusion

- Does your AI collect personal data from people?
- What does it do with the data?

Q5. **Explain Steps in NLP:**

1. Lexical Analysis:

This step breaks down text into individual words (tokens) and identifies their grammatical structure, including parts of speech. It's like identifying the building blocks of language.

2. Syntactic Analysis (Parsing):

This step analyzes the grammatical structure of sentences, identifying relationships between words and phrases. It ensures the sentence is grammatically correct and helps understand the sentence's structure.

3. Semantic Analysis:

This step focuses on the meaning of words and sentences, determining the

intended meaning in context. It also considers the context of the sentence and the overall meaning.

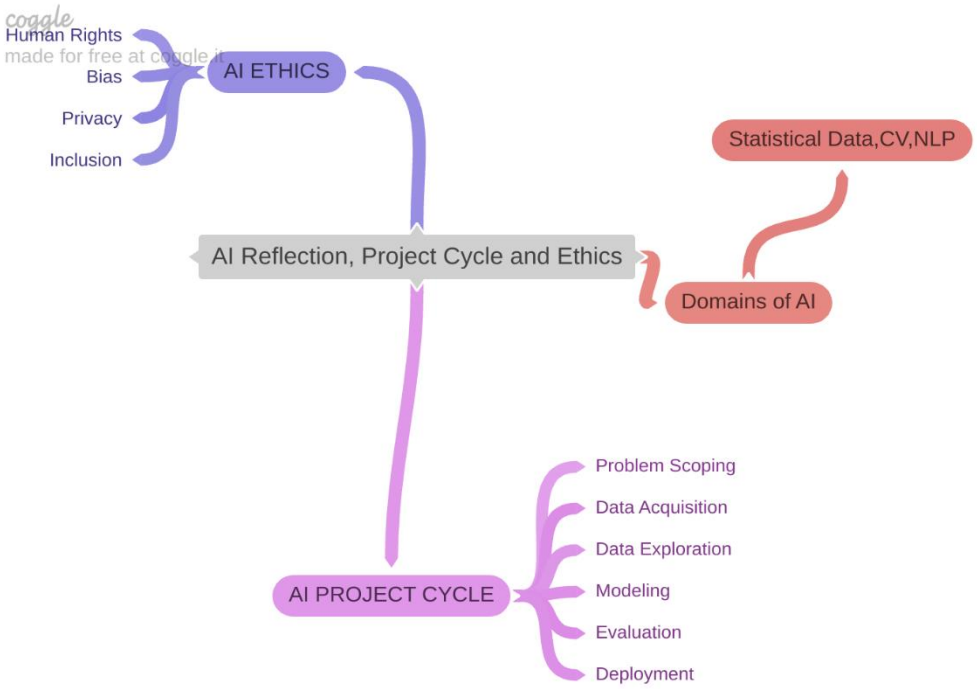
4. Discourse Integration:

This step considers the relationship between sentences, helping to understand the flow of ideas and the overall meaning of a larger text. It helps to understand how different sentences relate to each other.

5. **Pragmatic Analysis:**

This step considers the context in which the text is used, including the speaker, listener, and the purpose of the communication. It helps to understand the intended meaning beyond the literal words.

MIND MAP



UNIT-2: DATA LITERACY

LEARNING OUTCOMES

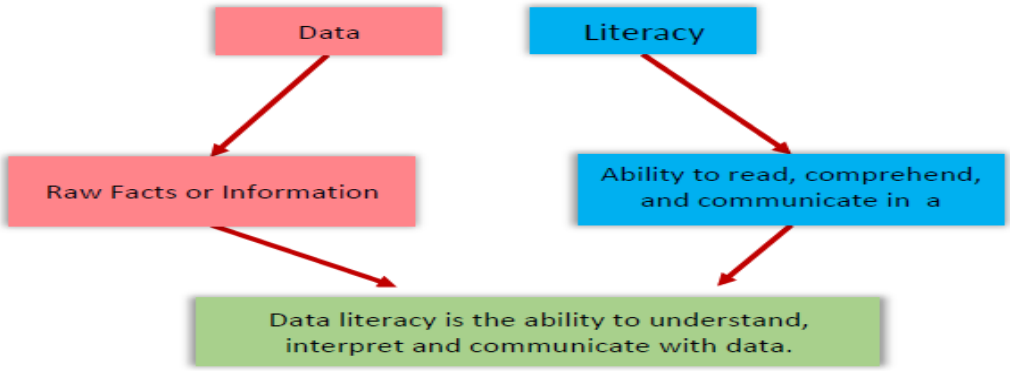
- To guide students in becoming data-literate individuals who can handle data responsibly and intelligently.
- Define data literacy and recognize its importance and to understand how data literacy enables informed decision-making and critical thinking.
- Apply the Data Literacy Process Framework to analyze and interpret data effectively and differentiate between data privacy and security.
- Identify potential risks associated with data breaches and unauthorized access.
- Learn measures to protect data privacy and enhance data security and determine the best methods to acquire data.
- Classify different types of data and enlist different methodologies to acquire it ,define and describe data interpretation, explain the different methods of data interpretation and recognize the types and importance of data interpretation.
- Apply acquired knowledge to select and employ appropriate data visualization methods

MAIN POINTS

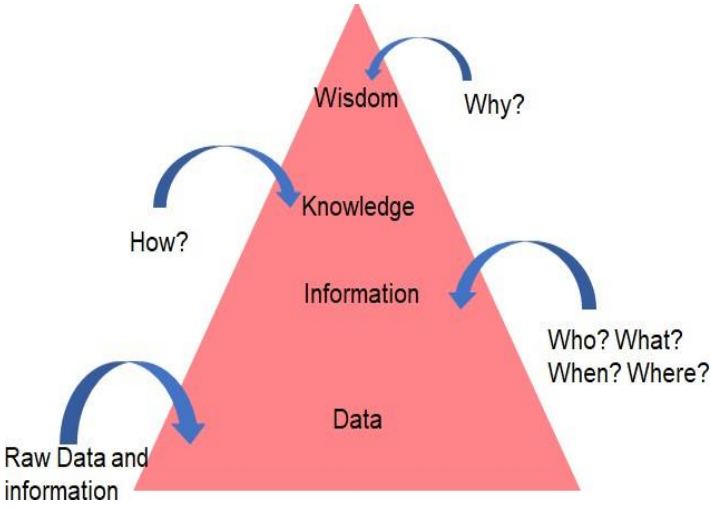
Basics of data literacy

Introduction to Data Literacy

Data literacy means knowing how to understand, work with, and talks about data. It's about being able to collect, analyze, and show data in ways that make sense. Data literacy is essential because it enables individuals to make informed decisions, think critically, solve problems, and innovate.



Data Pyramid Data Pyramid is made of different stages of working with data.



Impact of data Literacy

Every data tells a story, but we must be careful before believing the story. Data literacy is essential because it enables individuals to make informed decisions, think critically, solve problems and innovate.

How to become Data Literate?

Data Literate is a person who can interact with data to understand the world around them.

Scenario: Buying a product online

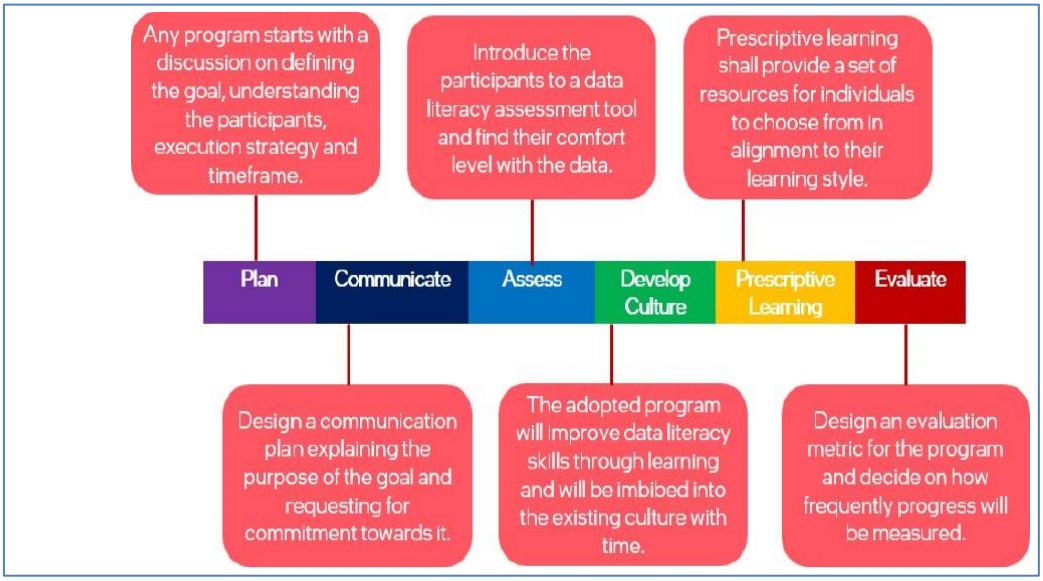
Data literacy helps people research about products while shopping over the internet.

A data literate person can –

- Filter the category as per the requirement – If the budget is low, select the price filter as low to high
- Check the user ratings of the products
- Check for specific requirements in the product

Data Literacy Process Framework

The data literacy framework provides guidance on using data efficiently and with all levels of awareness. Data literacy framework is an iterative process.



What are data security and privacy? How are they related to AI?

Data Privacy and Data Security are often used interchangeably but they are different from each other.

What is Data Privacy?

Data privacy or information privacy is concerned with the proper handling of sensitive data including personal data and other confidential data, such as certain financial data and intellectual property data, to meet regulatory requirements as well as protecting the confidentiality and immutability of the data.

Eg: Downloading an unverified mobile application, Accepting the Terms of Service without reading.

Why Data Privacy is important?

- A data breach at a government agency can put top secret information in the hands of an enemy state.
- A breach at a corporation can put proprietary data in the hands of a competitor.
- A breach at a hospital can put personal health information in the hands of those who might misuse it.

The following best practices can help you ensure data privacy:

Understanding what data, you have collected, how it is handled, and where it is

stored.

- Necessary data required for a project should only be collected.
- User consent while data collection must be of utmost importance

What is Data Security?

Data security is the practice of protecting digital information from unauthorized access, corruption, or theft throughout its entire lifecycle.

Why is it important?

Due to the rising amount of data in the cloud there is an increased risk of cyber threats. The most appropriate step for such an amount of traffic being generated is how we control and protect the transfer of sensitive or personal information at every known place.

The most possible reasons why data security is more important now are:

- Cyber-attacks affect all the people
- The fast-technological changes will boom cyber attacks

Best Practices for Cyber Security

Cyber security involves protecting computers, servers, mobile devices, electronic systems, networks, and data from harmful attacks**.**

✓ Do's

- Use strong, unique passwords with a mix of characters for each account.
- Activate Two-Factor Authentication (2FA) for added security.
- Download software from trusted sources and scan files before opening.
- Prioritize websites with "https://" for secure logins.
- Keep your browser, OS and antivirus updated regularly.
- Adjust social media privacy settings for limited visibility to close contacts.
- Always lock your screen when away.
- Connect only with trusted individuals online.
- Use secure Wi-Fi networks.
- Report online bullying to a trusted adult immediately.

✗ Don't 's

- Avoid sharing personal info like real name or phone number.
- Don't send pictures to strangers or post them on social media.
- Don't open emails or attachments from unknown sources.

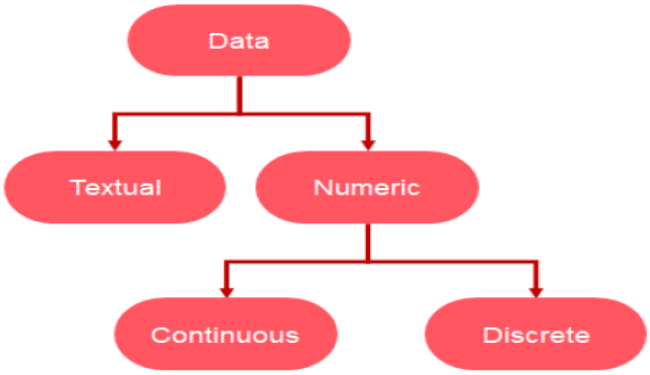
• Ignore suspicious requests for personal info like bank account details.
• Keep passwords and security questions private.
• Don't copy copyrighted software without permission.
• Avoid cyberbullying or using offensive language online.

Acquiring Data, Processing, and Interpreting Data

- Data is the raw fact and figure.

Types of data

Artificial Intelligence is crucial, with data serving as its foundation. We come across different types of information every day.
Some common types of data include:



Textual Data (Qualitative Data)	Numeric Data (Quantitative Data)
• It is made up of words and phrases • It is used for Natural Language Processing (NLP) • Search queries on the internet are an example of textual data • Example: "Which is a good park nearby?"	• It is made up of numbers • It is used for Statistical Data • Any measurements, readings, or values would count as numeric data • Example: Cricket Score, Restaurant Bill

Numeric Data is further classified as:

- **Continuous data** is numeric data that is continuous. E.g., height, weight, temperature, voltage

- **Discrete data** is numeric data that contains only whole numbers and cannot be fractional.

E.g. the number of students in the class – it can only be a whole number, not in decimals, A soccer team scored 0, 1, 2, or 3 goals in their last few matches. Goals are counted in whole numbers — not fractions.

Types of Data used in three domains of AI

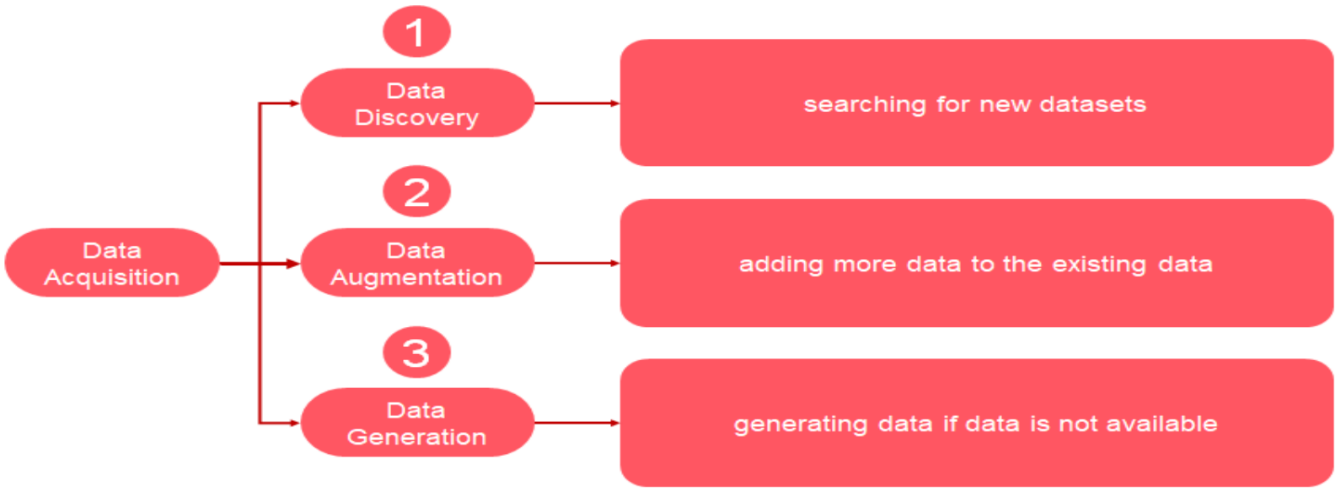
- Visual data -Eg: images,videos [Computer Vision(CV)]
- Textual data -Eg : Documents,pdf files etc [Natural Language Processing(NLP)]
- Numeric data – Eg : Tables,Excel sheets etc [Statistical Data (SD)]

Data Acquisition/Acquiring Data

Data Acquisition, also known as acquiring data, refers to the procedure of gathering data. This involves searching for datasets suitable for training AI models.

Steps Involved in Data Acquisition:

1) **Data Discovery**: Data discovery refers to searching new data sets.
2) **Data Augmentation**: Data augmentation means increasing the amount of data by adding copies of existing data with small changes.
3) **Data Generation**: Data generation refers to generating or recording data using sensors.



Sources of Data

Various Sources for Acquiring Data:

- **Primary Data Sources** — The data generated from the experiment is an example of primary data. Some of the sources for primary data include surveys, interviews, experiments etc.

- **Secondary Data Sources**—Secondary data collection obtains information from external sources, rather than generating it personally. Some sources for secondary data collection include: Kaggle, Google, .gov datasets etc.

Best Practices for Acquiring Data

Good Data	Bad Data
• Information is well structured	• Information is scattered
• It is accurate	• Contains a lot of incorrect values
• It is consistent.	• Contains missing and duplicate values
• It is clearly presented.	• It is poorly presented
• Contains information which is relevant to our requirement.	• Contains information which is not relevant to our requirement.

Ethical concerns in data acquisition

While gathering data and choosing datasets, certain ethical issues can be addressed before they occur:

Features of data and Data Preprocessing

Usability of Data

There are three primary factors determining the usability of data:

1. **Structure-** Defines how data is stored.
   For example data stored in spreadsheet will have good structure where as the same data stored in text document will have poor structure.
2. **Cleanliness-** Clean data is free from duplicates, missing values, outliers, and other anomalies that may affect its reliability and usefulness for analysis.
3. **Accuracy**- Accuracy indicates how well the data matches real-world values, ensuring reliability. Accurate data closely reflects actual values without errors, enhancing the quality and trustworthiness of the dataset.

Features of Data

Data features are the characteristics or properties of the data. They describe each piece of information in a dataset.

For example,

- In a table of student records, features could include things like the student's name, age, or grade.
- In a photo dataset, features might be the colors present in each image. These features help us understand and analyze the data.

In AI models, we need two types of features: independent and dependent

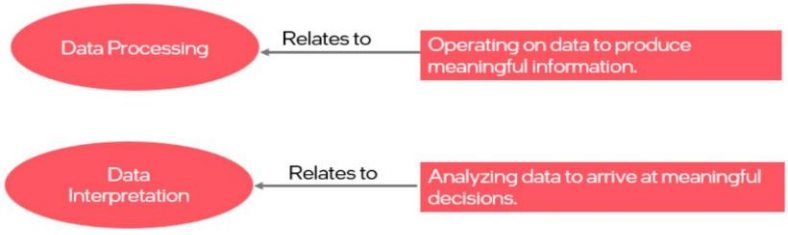
Independent features are the input to the model—they're the information we provide to make predictions.

Dependent features, on the other hand, are the outputs or results of the model-they're what we're trying to predict.

In research, researchers often manipulate and measure independent and dependent variables to test cause-and- effect relationships.

Data Processing and Data Interpretation

Data processing and interpretation have become very important in today's world.



Data Processing

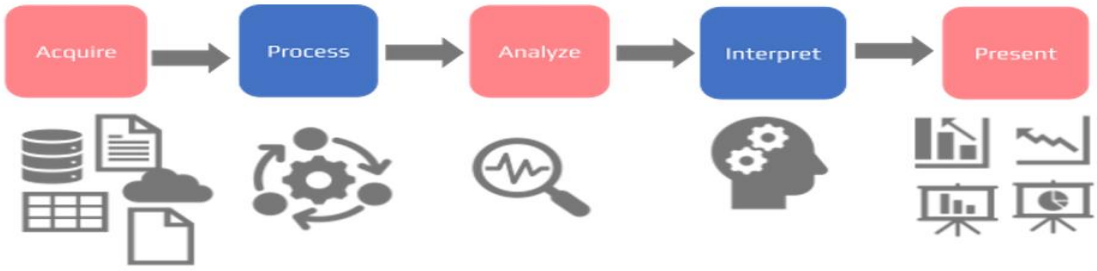
- Data processing helps computers understand raw data.
- Use of computers to perform different operations on data is included under data processing.

Data Interpretation

▪ It is the process of making sense out of data that has been processed.
▪ The interpretation of data helps us answer critical questions using data.

Understanding some keywords related to Data

- **Acquire Data**- Acquiring data is to collect data from various data sources.
- **Data Processing**- After raw data is collected, data is processed to derive meaningful information from it.
- **Data Analysis** – Data analysis is to examine each component of the data in order to draw conclusions.
- **Data Interpretation** – It is to be able to explain what these findings/conclusions mean in a given context.
- **Data Presentation**- In this step, you select, organize, and group ideas and evidence in a logical way.



Types of Data Interpretation

How to interpret Data?

Based on the two types of data, there are two ways to interpret data-

- Qualitative Data Interpretation

- Quantitative Data Interpretation

Qualitative Data Interpretation

Data Collection Methods – Qualitative Data Interpretation

Record keeping: This method uses existing reliable documents and other similar sources of information as the data source. It is similar to going to a library.

Observation: In this method, the participant – their behavior and emotions – are observed carefully

Case Studies: In this method, data is collected from case studies.

Focus groups: In this method, data is collected from a group discussion on relevant topic.

Longitudinal Studies: This data collection method is performed on the same data source repeatedly over an extended period.

One-to-One Interviews: In this method, data is collected using a one-to-one interview.

5 Steps to Qualitative Data Analysis

1. Collect Data
2. Organize
3. Set a code to the Data Collected
4. Analyze your data
5. Reporting

Quantitative Data Interpretation

- Quantitative data interpretation is made on numerical data
- It helps us answer questions like "when," "how many," and "how often"
- For example – How many numbers of likes on the Instagram post?

Data Collection Methods -Quantitative Data Interpretation

- Interviews: Quantitative interviews play a key role in collecting information.
- Polls: A poll is a type of survey that asks simple questions to respondents. Polls are usually limited to one question.
- Observations: Quantitative data can be collected through observations in a particular time period
- Longitudinal Studies: A type of study conducted over a long time
- Survey: Surveys can be conducted for a large number of people to collect quantitative data.

4 Steps to Quantitative Data Analysis

1. Relate measurement scales with variables
2. Connect descriptive statistics with data
3. Decide a measurement scale
4. Represent data in an appropriate format

Difference between Qualitative and Quantitative Data

Qualitative Data Interpretation	Quantitative Data Interpretation
Categorical	Numerical
Provides insights into feelings and emotions	Provides insights into quantity
Answers how and why	Answers when, how many or how often
Methods- Interviews, Focus Groups	Methods – Assessment , Tests, Polls, Surveys
Example question – Why do students like attending online classes?	Example question – How many students like attending online classes?

Types of Data Interpretation (DI)

There are **three ways** in which data can be presented:

- Textual
- Tabular
- Graphical

Textual Data Interpretation

▪ The data is mentioned in the text form, usually in a paragraph.
▪ Used when the data is not large and can be easily comprehended by reading.
▪ Textual presentation is not suitable for large data.

Eg: "A company conducted a survey to find out employee satisfaction levels. Out of 500 employees:300 said they were satisfied with their job.120 said they were neutral.80 said they were dissatisfied.

Interpretation- 60% (300 out of 500) of employees are satisfied.
24% are neutral.
16% are dissatisfied.

Tabular Data Interpretation

- Data is represented systematically in the form of rows and columns.

- Title of the Table (Sales Growth (2020 to 2022) contains the description of the table content.
- Column Headings(Year; Product A Sales (in units); Product B Sales (in units); contains the description of information contained in columns.

Eg: **Sales Growth (2020 to 2022)**

Year	Product A Sales (in units)	Product B Sales (in units)
2020	1,200	1,000
2021	1,500	1,300
2022	1,800	1,700

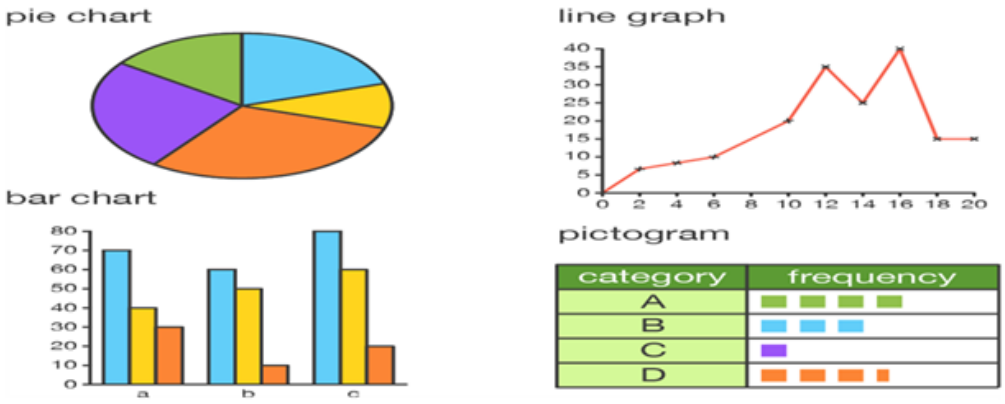
Interpretation - Sales Growth (2020 to 2022):

- Product A: Increased from 1,200 to 1,800 units → **50% growth**.
- Product B: Increased from 1,000 to 1,700 units → **70% growth**.

Graphical Data Interpretation

Graphical data interpretation is a skill that involves using visual representations of data to make informed decisions and derive insights.

Eg:



Importance of Data Interpretation

- **Informed Decision Making –** A decision is only as good as the knowledge is based on. Eg: Since the average height of students is known, school can custom design the furniture according to the requirement of the class.

- **Reduced Cost –** Identifying needs can lead to reduction in cost. Eg: Based on the review or survey from customer, production of the items with low review/interest can be drop/modify.
- **Identifying Needs –** We can identify needs of people by Data Interpretation. Eg: Pizza is a popular choice among age group 8-10

Project Interactive Data Dashboard & Presentation

Data can be collected and can be visualized using visual data analytics platform like tableau or MS Excel or Datawrapper using which graphs or chart can be prepared on the basis of collected data which aids in decision making like which is the highest yield grain in India among wheat, rice, jowar, barley etc.

Instructions

- Download Tableau public with the help of an adult using this link -
- https://public.tableau.com/en-us/s/download
- Install the package via the install wizard.

MULTIPLE CHOICE QUESTIONS

Q1. What does data literacy primarily involve?

a. Learning how to use a computer
b. Knowing how to understand, work with, and talk about data
c. Creating databases
d. Collecting data for surveys

Q2. Which of the following is NOT a component of the Data Pyramid?

a. Data
b. Information
c. Knowledge
d. Imagination

Q3. Why is data literacy important?

a. It helps in collecting data more efficiently
b. It enables individuals to make informed decisions and solve problems
c. It helps in creating complex algorithms
d. It allows individuals to work without the need for technology

Q4. What does the Data Literacy Process Framework help with?

a. Making decisions faster

b. Organizing raw data
c. Analyzing and interpreting data effectively
d. Collecting data without errors

Q5. **Assertion (A):** Data privacy is an essential component of AI data literacy.
Reason (R): Protecting personal information within datasets is not required as long as the AI provides accurate results. Consider both the statements and choose the correct answer.
a. Both A and R are correct and R is the correct explanation of A.
b. Both A and R correct but R is not the correct explanation of A
c. A is correct but R is not correct.
d. A is not correct but R is correct

Q6. What is an example of primary data?
a. Data collected from public records
b. Data obtained from a government report
c. Data generated from an experiment
d. Data downloaded from the internet

Q7. Which of the following describes discrete data?
a. Height of a person
b. Weight of an object
c. The number of students in a class
d. Voltage readings

Q8. What does data augmentation refer to?
a. Searching for new data sources
b. Increasing data by slightly changing existing data
c. Generating data using sensors
d. Organizing the data

Q9. Which of the following is an example of secondary data?
a. Data collected through a survey
b. Data obtained from an experiment
c. Data from a government report
d. Data collected through direct observation

Q10. What is the main focus of data security?
a. Encrypting data
b. Protecting data from unauthorized access and theft

c. Making data publicly accessible
d. Making data compatible with various formats

Q11. What is meant by data discovery in data acquisition?
a. Generating new data
b. Searching for datasets suitable for a particular project
c. Collecting data from surveys
d. Organizing existing data into categories

Q12. Which of the following is an ethical concern in data acquisition?
a. Ensuring data is freely available
b. Collecting irrelevant data
c. Ensuring that data collection is transparent and consensual
d. Using data for commercial purposes only

Q13. What does the structure of data define?
a. The cleanliness of data
b. The way data is processed
c. The way data is stored
d. The accuracy of data

Q14. Which of the following is a characteristic of good data?
a. Contains irrelevant information
b. Is well-structured and accurate
c. Is scattered and inconsistent
d. Is difficult to interpret

Q15. When interpreting data what does identifying trends help with?
a. Making random decisions
b. Understanding past behaviours and predicting future ones
c. Ignoring irrelevant information
d. Focusing only on numerical data

Q16. Which of the following is NOT a data collection method for qualitative data?
a. Surveys
b. Focus groups
c. Observations
d. Case studies

Q17. What does qualitative data interpretation help answer?

a. How many times something occurs
b. What something looks like
c. How something behaves or is perceived
d. When an event happened

Q18. Which method involves using existing reliable documents as data sources?

a. Observation
b. Case studies
c. Record keeping
d. Focus groups

Q19. What is an example of a qualitative data collection method?

a. Polls
b. Observations
c. Surveys
d. Interviews

Q20. Which of the following tools can help with graphical data interpretation?

a. Tableau
b. Microsoft Word
c. Adobe Photoshop
d. Excel's built-in editor

Answers:

1.b	2.d	3.b	4.c	5.c	6.c	7.c	8.b	9.c	10.b
11.b	12.c	13.c	14.b	15.b	16.a	17.c	18.c	19.b	20.a

SHORT ANSWER QUESTIONS

Q1. What is Data Literacy?

Answer:

Data literacy refers to the ability to understand, work with, and communicate data effectively. It involves collecting, analyzing, and presenting data in ways that are meaningful and useful.

Q2. Why is Data Literacy important?

Answer:

Data literacy is important because it helps individuals make informed decisions, think critically, solve problems, and innovate by understanding and using data.

Q3. What is the Data Pyramid?

Answer:

The Data Pyramid consists of four stages: Data (raw form), Information (processed data), Knowledge (understanding patterns), and Wisdom (understanding why things happen).

Q4. What is Data Privacy?

Answer:

Data privacy involves protecting sensitive personal data and ensuring it is handled according to regulatory requirements, safeguarding its confidentiality and integrity.

Q5. What is Data Security?

Answer:

Data security refers to the practice of protecting digital data from unauthorized access, corruption, or theft throughout its lifecycle.

Q6. What is Data Augmentation?

Answer:

Data augmentation is the process of increasing the amount of data by adding copies of existing data with slight modifications (e.g., adjusting color or brightness in images).

Q7. What are Primary and Secondary Data Sources?

Answer:

Primary data is collected directly from experiments or surveys. Secondary data is gathered from external sources, such as reports or databases.

Q8. What is the difference between Quantitative and Qualitative Data?

Answer:

Quantitative data deals with numerical values (e.g., height, temperature), while qualitative data is descriptive and categorical (e.g., opinions, behaviours).

Q9. What is Data Discovery?

Answer:

Data discovery is the process of searching for datasets that are suitable for a particular project or task, such as finding images for training an AI model.

Q10. What are the best practices for Data Privacy?

Answer:

Best practices include understanding what data is collected, ensuring onl necessary data is gathered, and obtaining user consent for data collection.

LONG ANSWER TYPE QUESTIONS

Q1. What are the steps involved in the Data Literacy Process Framework? How is it an iterative process?

Answer:

The Data Literacy Process Framework includes steps to help individuals interact with and analyze data effectively:

1. Acquiring data – Gathering data through discovery, augmentation, or generation.
2. Processing data – Cleaning, organizing, and preparing data for analysis.
3. Interpreting data – Understanding and deriving insights from data.

It is iterative because these steps often repeat as new data becomes available or as additional analysis is needed. For example, after interpretation, one might go back to collect more or better data.

Q2. Differentiate between data privacy and data security with examples.

Answer:

Data Privacy refers to the correct handling of sensitive personal or confidential data.It focuses on who has access to the data.

Example: Asking for user consent before collecting their location data ensures data privacy.

Data Security refers to the protection of data from unauthorized access, corruption, or theft.

Example: Using encryption to protect data during online transactions ensures data security.

Though related, privacy is about access and rights, while security is about protection and safeguards.

Q3. What is informed decision-making? How does data literacy help in making informed decisions? Give an example.

Answer:

Informed decision-making is the process of making choices based on data, facts, and logical reasoning rather than assumptions. Data literacy enables people to collect, analyze, and interpret data to make better decisions.

Example: When buying a mobile phone online, a data-literate person checks ratings, prices, and specifications using filters and user reviews to select the best product for their needs and budget.

Q4. Describe the ethical concerns in data acquisition and how they can be

addressed.

Answer:

Ethical concerns in data acquisition include:

Privacy Violations: Collecting data without user consent.

Bias: Using datasets that are not diverse or fair.

Misuse: Using data for unintended or harmful purposes.

These concerns can be addressed by:

- Getting user consent before collecting data.
- Ensuring diversity in data sources.
- Using data only for its intended and ethical purposes.
- Addressing these issues promotes fairness, trust, and legal compliance.

Q5. How can a person become data literate? Mention any three skills or habits they should develop.

Answer:

To become data literate, a person should develop:

Analytical Thinking: Ability to analyze and interpret data meaningfully.

Tool Usage: Familiarity with tools like Excel, Tableau, or Datawrapper for visualization.

Critical Evaluation: Skill to assess the reliability and relevance of data sources.

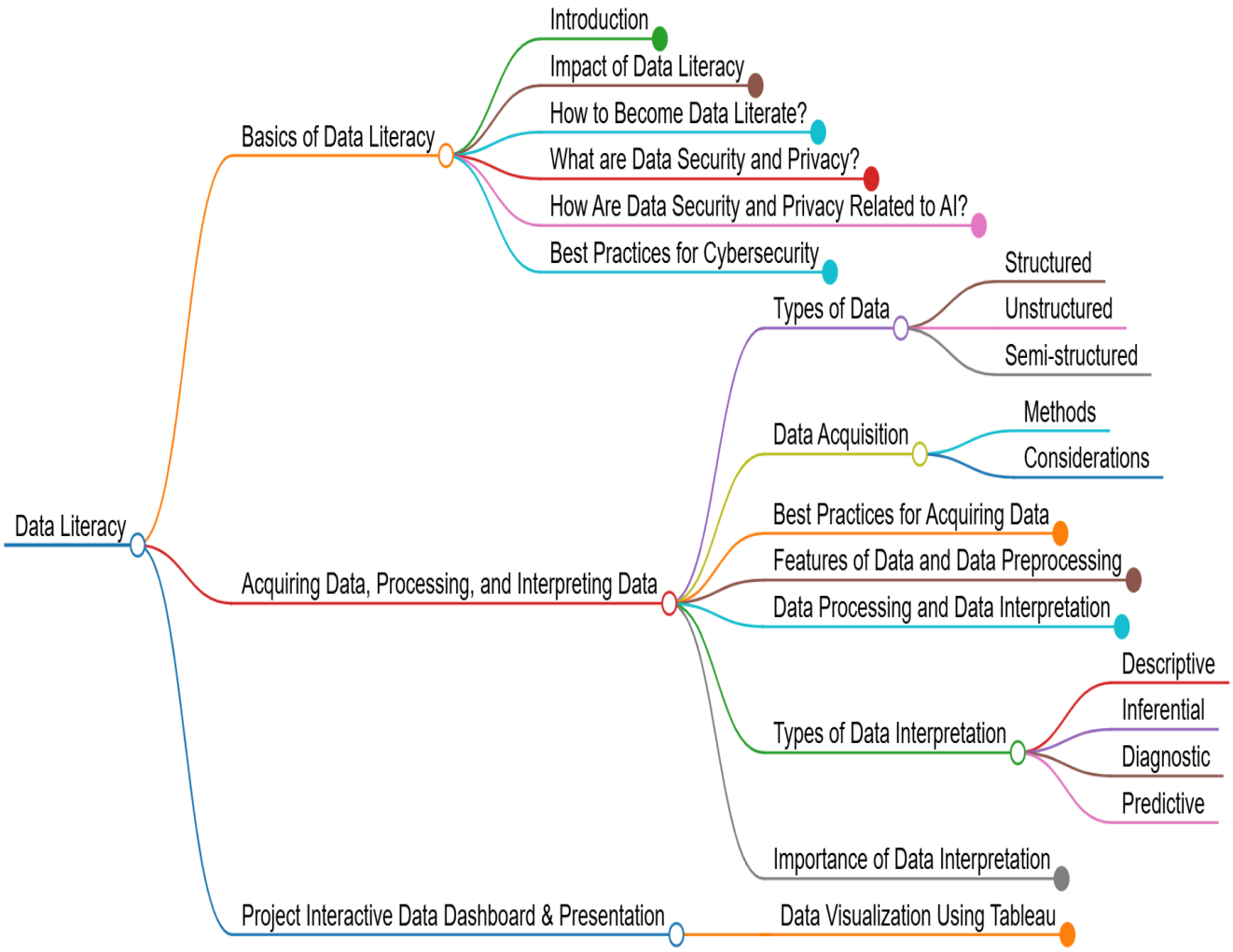
Practicing these skills helps individuals make informed decisions and engage effectively with the data-rich world around them.

REFERENCE LINKS

TOPIC	LINK
Basics of data literacy	https://www.cbse.gov.in/cbsenew/documents/Cyber%20Safety.pdf Video Links: https://www.youtube.com/watch?v=yhO_t-c3yJY https://youtu.be/aO858HyFbKI?si=-5U2CuN5y9HF7pNj

Acquiring Data, Processing, and Interpreting Data	https://trends.google.com/trends/?geo=IN (Google Trends)
Project Interactive Data Dashboard & Presentation	● https://public.tableau.com/en- us/s/download ●https://www.datawrapper.de/ Video Links: ●https://www.youtube.com/watch?v=NLCzpPRCc7U ● https://www.youtube.com/watch?v=_M 8BnosAD78

MIND MAP



Unit 3: Math for AI (Statistics & Probability)

LEARNING OUTCOMES

- To know the applications of Mathematics in AI , analyzing the data in the form of numbers/images and find the relation/pattern between the them.
- To know the different mathematical concepts important for understanding AI?
- To understand the concepts of statistics and probability and know how they are used in different AI applications in real life scenarios?

MAIN POINTS

Students will grasp the vital foundational concepts of mathematics that makes an AI project compelling. Through simple hands-on activities and relatable examples, learners will be introduced to the principles of linear algebra, calculus, statistics, and probability. They will also learn to recognize the practical applications of statistics and probability in daily life.

How are Math and AI related to each other?

Math is the study of patterns

- To solve the puzzles, you identify an order/arrangement in the list of numbers or the images.
- This arrangement is called a pattern.
- These patterns exist all around us.
- We have patterns in numbers, images, and language. AI is a way to recognize patterns
- AI can learn to recognize patterns, like human beings.
- AI can see patterns in different types of data - numbers, images, and speech and text.
- These patterns help AI to solve puzzles – like identifying dogs and muffins, or predicting hurricanes!
- Math is the study of patterns
- AI is a way to recognize patterns in order to take decisions
- AI needs Math to study and recognize patterns in order to take decisions

AI uses Math for:

- Statistics (Exploring data): Example – What is the middle value of the data? Which is the most common value in the data?
- Calculus (training and improving AI model): Example – which line is more slanted? Which figure covers more area?
- Linear Algebra (finding out unknown or missing values): Example – How many plants are there in total? How many cars are there in a city?
- Probability (predicting different events): Example – what will be the possible results of a coin toss? Will it rain tomorrow?

STATISTICS

Statistics is used for collecting, exploring, and analyzing the data. It also helps in drawing conclusions from data.

Applications of Statistics:

▪ Predict the performance of sports teams

▪ It can be used to find out specific things such as:

- the reading level of students
- the opinions of voters
- the average weight of a city's resident

Some more applications of Statistics

Disaster Management:

▪ Authorities use statistics to alert the citizens residing in places that might be affected by a natural disaster in near future.

The disaster management teams use statistics to know about the population, and about the services and infrastructure present in the affected area.

Sports:

▪ The Tokyo 2020 Olympics were postponed due to the developing global situation in light of the Covid-19 pandemic.

▪ Statistics revealed that COVID cases sharply increased in Japan during the planned period of Olympics.

Disease prediction

▪ US government uses statistics to understand which disease is affecting the population the most.

▪ This helps them in curing these diseases more effectively.

▪ Example - government can analyze the areas where COVID cases are increasing, or where the vaccination drive needs to be improved.

Weather forecast

▪ Computers use statistics to forecast weather.

▪ They compare the weather conditions with the information about past seasons and conditions.

PROBABILITY

Purpose: To understand the possibility of occurrence of an event.

Probability is a way to tell us how likely something is to happen.

For example – When a coin is tossed, there are two possible results or outcomes: heads (H) or tails (T) The probability equation defines the likelihood of the happening of an event. It is the ratio of favourable outcomes to the total favourable outcomes. The probability formula can be expressed as,

$$P(A) = \frac{\text{Number of favorable outcomes to A}}{\text{Total number of possible outcomes}}$$

We say that the probability of the coin landing H is ½ and the probability of the coin landing T is ½ When we talk about probability, we use a few terms that help us understand the chances for something to happen.

Probability can be expressed in the following ways:

▪ Certain events: An event will happen without a doubt

▪ Likely events: The probability of one event is higher than the probability of another event

▪ Unlikely events: One event is less likely to happen than another event

▪ Impossible events: There's no chance of an event happening

▪ Equal Probability events: Chances of each event happening is same

The probability of an event occurring is somewhere between impossible and certain.

• If an event is certain or sure to happen, it will have a probability of 1.

For example, the probability that it will rain in the state of Florida at least once in a specific year is 1.

• If an event will never happen or is impossible, it will have a probability of 0. For example, the probability that you can pick a red ball from a bag containing only blue balls is 0.

Probability – Applications

Sports

▪ Probability can be used in estimating batting average in Cricket.

▪ Batting average in Cricket represents how many runs a batsman would score before getting out.

▪ For instance, if a batsman had scored 45 runs out of 100 from only boundaries in the last match. Then, there is a chance that he will score 45% of his runs in the next match from boundaries.

Weather Forecasting

▪ One of the most common real-life examples of using probability is weather forecasting.

▪ It is used by weather forecasters to assess how likely it is that there will be rain, snow, clouds, etc., on a given day in a certain area.

▪ Forecasters may say things like "there is a 70% chance of rain today between 4 PM and 6 PM" to indicate a medium to high likelihood of rain during certain hours.

Traffic Estimation

▪ Regular people often use probability when they decide to drive to someplace.

▪ Based on the time of day, location in the city, weather conditions, etc. people tend to make probability predictions about how bad traffic will be during a certain time.

▪ For example, if you think there's a 90% probability that traffic will be heavy from 6 PM to 7:30 PM in your vicinity then you may decide to wait during that time.

MULTIPLE CHOICE QUESTIONS

Q1. What is the purpose of finding patterns in numbers and images for Al ?

(a) To make Al more complicated

(b) To slow down Al's learning process

(c) To enable Al to make predictions and decisions

(d) To confuse Al algorithms

Q2. Which branch of math deals with summarizing and analysing data?

(a) Algebra (c) Statistics

(b) Geometry (d) Calculus

Q3. How does Al use linear algebra ?

(a) To understand shapes and colours (c) To manipulate data in multiple dimensions

(b) To calculate probabilities (d) To analyse historical weather data

Q4. What is the purpose of probability theory in Al?

(a) To eliminate uncertainty

(b) To avoid making decisions

(c) To make decisions under uncertainty

(d) To make decisions based on facts only

Q5. Which of the following is an example of pattern recognition in images?

(a) Identifying numbers in a captcha

(b) Calculating the area of a circle

(c) Solving Algebraic Equations

(d) Translating Text of one language to another language

Q6. Which of the following is an application of Al in healthcare?

(a) Predicting stock prices

(b) Recommending movies

(c) Translating text from one language to another

(d) Identifying diseases in medical images

Q7. How does Al use probability in self-driving cars?

(a) To estimate the likelihood of accidents

(b) To measure distances between vehicles

(c) To detect Traffic signals

(d) All of the above

Q8. Which of the following is an example of pattern recognition in natural language processing?

(a) Identifying spam emails

(b) Predicting stock prices

(c) Translating text from one language to another

(d) Analysing customer reviews

Q9. How does calculus contribute to the optimization of Al algorithms in robotics?

(a) By calculating probabilities

(b) By analysing spatial relationships
(c) By adjusting parameters to minimize errors
(d) By generating 3D models

Q10. How does Al use linear algebra in machine learning?
(a) To predict future events
(b) To analyse historical data
(c) To represent data in multidimensional space
(d) To perform statistical analysis

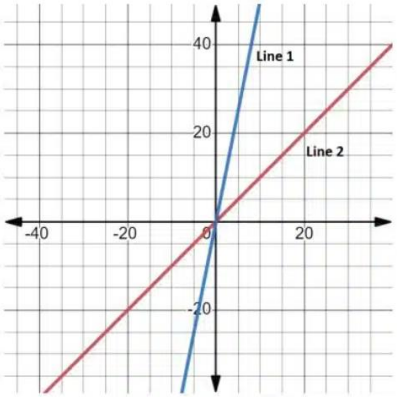
Q11. Which two are examples of descriptive statistics?
a. Median and correlation.
b. Mean and standard deviation.
c. Mode and regression analysis.
d. Variance and Hypothesis testing.

Q12. What is the probability of getting head when you toss a coin once?
a. 0.75
b. 1
c. 0
d. 0.5

Q13. Getting seven in die throwing is a possible event.
a. True
b. False

Q14. The median of the data: 155, 160, 145, 149, 150, 147, 152, 144, 148 is ____
a. 149
b.150
c.147
d.144

Q15. In the given figure, which of the two lines is more slanted?



a. Line 1

b. Line 2

Q16. If the coin shown in the figure below is used for a toss, what can be the possible result?

Head **Tail**

a. 1

b. 0.5

c. 0.75

d. 0

Q17. _____theory provides methods to manage and navigate uncertainty.

a. Probability

b. Statistics

c. Linear Algebra

d. Calculus

Q18. If suppose, you want to make a robot which can go forward, which type of mathematics concepts is required?

a. Probability

b. Statistics

c. Calculus

d. None of the above

Q19. What is the purpose of mathematics in AI?

a. Writing AI content

b. Creating hardware

c. Recognizing and analyzing patterns

d. None of the above

Q20. Which of the following mathematical concept is fundamental for AI?

a. Probability
b. Statistics
c. Linear Algebra
d. Calculus

Q21. What type of patterns does AI can recognize?

a. Speech and text
b. Numbers and images
c. Both a. and b.
d. None of the above

Q22. Math is the study of __.

a. List
b. Methods
c. Patterns
d. None of the above

Q23. AI is a way to recognize patterns, like _.

a. Machine
b. Human beings
c. Solving puzzles
d. None of the above

Q24. Observe and analyze the mission numbers 2, 4, 6, 8, 10, 12, _?

a. 14
b. 16
c. 18
d. 20

Q25. Observe and analyze the mission numbers 4, 10, 16, 22, 28,_?

a. 32
b. 34
c. 38
d. 40

Q26. Observe and analyze the mission numbers 34, 31, 28, 25, 22,_?

a. 19
b. 16
c. 14

d. 10

Q27. If Year 1 Profit was INR 1000; Year 2 Profit was INR 1500; Year 3 Profit was INR 2000; Year 4 Profit was INR 2500, can you predict the profit for Year 5?

a. INR 3000
b. INR 3500
c. INR 4000
d. INR 4500

Q28. What is the middle value of the given numbers?

11, 22, 33, 44, 55

a. 22
b. 33
c. 44
d. 55

Q29. In dataset, the middle value is known as __.

a. Range
b. Median
c. Mean
d. None of the above

Q30. If a fair coin is tossed, what is the probability of getting heads?

a. 1
b. 0.5
c. 0.75
d. 0

Q31. A has 2 plants, B has 3 plants, C has 1 plant, D has 7 plants. How many plants are there in total?

a. 12 plants
b. 13 plants
c. 14 plants
d. 15 plants

Q32. If you want to find the possible results of a coin toss, which mathematical method will be helpful?

a. Probability
b. Statistics
c. Linear Algebra
d. Calculus

Q33. Which mathematical formula is used to finding out unknown or missing values?

a. Probability
b. Statistics
c. Linear Algebra
d. Calculus

Q34. Which mathematical formula is used to training and improving AI model?

a. Probability
b. Statistics
c. Linear Algebra
d. Calculus

Q35. Which mathematical formula is used to predicting different events?

a. Probability
b. Statistics
c. Linear Algebra
d. Calculus

Q36. What is the primary purpose of statistics ?

(a) To collect and analyze data
(b) To study historical events
(c)To Solve mathematical equations.
(d) To predict future outcomes

Q37. What role does statistics play in disease prediction ?

(a) Identifying risk factors
(b) Designing new medications
(c) Analyzing weather patterns
(d) Building bridges

Q38. What is the significance of data collection in statistics?

(a) It forms the basis for analysis
(b) It helps in designing new products
(c) It is not important
(d) It is used for playing Video Games

Q39.How do epidemiologists use statistics in disease surveillance?

(a) To determine number of beds in hospitals
(b) To check medical staff competence
(c) To monitor disease trends

(d) All of these

Q40. Which mathematical formula is used to exploring data in AI?

a. Probability

b. Statistics

c. Linear Algebra

d. Calculus

Answers:

Q1. (c)	Q2 (c)	Q3 (c)	Q4 (c)	Q5 (a)	Q6 (d)
Q7 (d)	Q8 (a)	Q9 (c)	Q10 (c)	Q11 (b)	Q12 (d)
Q13 (b)	Q14 (a)	Q15 (a)	Q16 (b)	Q17 (a)	Q18 (a)
Q19 (c)	Q20 (b)	Q21 (c)	Q22 (c)	Q23 (b)	Q24 (a)
Q25 (b)	Q26 (a)	Q27 (a)	Q28 (b)	Q29 (b)	Q30 (b)
Q31 (b)	Q32 (a)	Q33 (c)	Q34 (d)	Q35 (a)	Q36 (a)
Q37 (a)	Q38 (a)	Q39 (c)	Q40 (b)		

SHORT ANSWER QUESTIONS

Q1. How does AI use statistics to analyze data?

Ans: AI uses statists to summarize and interpret data, identify trends and predict the patters observing existing data.

Q2. Explain how probability theory helps AI make decisions?

Ans: Probability theory enables Al to quantify uncertainty and make decisions based probabilistic approach. By assigning probabilities to different events and updating them as new information becomes available, AI can make informed decisions in uncertain environments as per requirements.

Q3. Give an example how Al uses patterns in numbers and uses the learning to solve a problem.

Ans. Think of it like how a child might learn that "bigger toys cost more" by seeing prices in a store. Over time, they start to predict prices of toys they haven't seen before, just by estimating their size.

Q4. What is the purpose of linear algebra in Al?

Ans. Linear algebra helps Al represent and manipulate data in multiple dimensions,

enabling tasks such as image processing, dimensionality reduction, neural network, optimization and machine learning.

Q5. How does calculus contribute to the optimization of Al algorithms?

Ans. Calculus, especially **differential calculus**, is used to compute **gradients** that guide how AI algorithms update their parameters to minimize error. This process, called **gradient descent**, helps models learn by finding the optimal values for weights.

Q6. Give an example of a pattern in numbers and explain how AI can identify it.

Ans: A simple pattern is: **2, 4, 6, 8, 10** (increasing by 2 each time).AI can identify this pattern by learning the rule (add 2) from training data and using it to predict future numbers like 12.

Q7. What is the main purpose of using math in AI?

Ans: Math is used in AI to recognize patterns and make decisions based on data.

Q8. What is the definition of statistics as given in the document?

Ans: Statistics is defined as the collection, exploration, and analysis of data to draw conclusions.

Q9. Name one real-life application of probability mentioned in the document.

Ans: Weather forecasting is one real-life application of probability mentioned.

Q10. What mathematical concept helps in predicting different events?

Ans: Probability helps in predicting different events.

Q11. Why is data collection important in AI, as discussed in the document?

Ans: Data collection forms the basis of analysis and interpretation, which are crucial for AI decision-making.

Q12. What type of event has a probability of 1?

Ans: A certain event has a probability of 1, meaning it will definitely happen.

Q13. How is probability calculated, according to the document?

Ans: Probability is calculated as the ratio of the number of favorable outcomes to the total number of possible outcomes.

Q14. What is an example of using statistics in sports as mentioned?

Ans: Predicting the batting average in cricket is an example of using statistics in sports.

Q15. What kind of mathematical problems does AI solve using linear algebra?

Ans: AI uses linear algebra to find unknown or missing values.

Q16. What is a likely event?

Ans: A likely event is one that has a high probability of occurring, such as flipping a coin and getting either heads or tails.

Q17. What does the document say about events that have the same likelihood of occurring?

Ans: These are called equal probability events.

Q18. How does AI recognize patterns, according to the document?

Ans: AI recognizes patterns in various types of data, such as numbers, images, and text, similar to how humans do.

Q19. What is an impossible event?

Ans: An impossible event is one that has no chance of happening, with a probability of 0.

Q20. How do computers use statistics for weather forecasting?

Ans: Computers compare current weather conditions with historical data to predict future weather patterns.

LONG ANSWER TYPE QUESTIONS

Q1. How do metrologists use statistics in weather forecasting?

Ans: Meteorologists rely on statistics to enhance the accuracy of weather forecasts in several ways:

- **Data Collection & Preprocessing**: Weather data comes from satellites, radars, and ground stations. Statistical techniques help clean and standardize this data, handling missing values and removing outliers.
- **Descriptive Statistics**: Measures like mean, median, and standard deviation summarize weather patterns. For example, calculating the average temperature over a month provides insight into general conditions.
- **Time Series Analysis**: Since weather data is chronological, time series models like ARIMA help identify trends, seasonal effects, and cyclic behaviors, improving predictions.
- **Numerical Weather Prediction (NWP)**: Meteorologists use mathematical models that treat the atmosphere as a fluid. These models rely on statistical techniques to approximate missing observations and refine predictions.

- **Regression Models**: Statistical regression techniques help predict climatological parameters, such as temperature trends, based on historical data.

These statistical methods have significantly improved forecasting accuracy, helping communities prepare for weather events. Want to dive deeper into any of these techniques?

Q2. How does statistics contribute to disease surveillance?

Ans: Statistics plays a crucial role in disease surveillance by helping public health officials track, analyze, and predict outbreaks. Here's how:

- **Data Collection & Monitoring**: Health agencies gather data on disease cases, symptoms, and demographics. Statistical methods ensure accurate reporting and help detect unusual patterns.
- **Trend Analysis**: By analyzing historical data, statisticians identify seasonal trends and emerging threats, allowing early intervention.
- **Predictive Modelling**: Advanced statistical models forecast disease spread, helping governments allocate resources effectively.
- **Risk Assessment**: Epidemiologists use statistics to determine risk factors, guiding preventive measures.
- **Evaluation of Interventions**: Statistical analysis assesses the effectiveness of vaccines, treatments, and public health policies.

India's **Integrated Disease Surveillance Programme (IDSP)** is an example of how statistics aids in monitoring epidemic-prone diseases

Q3. Explain how statistics is used in predicting the outcome of sports events?

Ans: Statistics plays a crucial role in predicting sports outcomes by analyzing historical data, player performance, and team dynamics. Here's how:

- **Historical Data Analysis**: Past match results, player statistics, and team performance trends help identify patterns that can predict future outcomes.
- **Regression Models**: Statistical techniques like logistic regression and machine learning algorithms assess factors such as team strength, injuries, and weather conditions to estimate probabilities of winning.

- **Player Performance Metrics**: Individual stats like batting averages in cricket or shooting accuracy in basketball contribute to forecasting game results.
- **Game Theory & Probabilistic Models**: Advanced models simulate different scenarios based on team strategies and player interactions.
- **Betting & Odds Calculations**: Sports betting markets use statistical models to set odds based on probabilities derived from historical data.

Modern sports analytics has revolutionized predictions, making them more accurate and insightful

Q4. Explain the importance of mathematics in AI.

Mathematics is fundamental to the development and functioning of AI, as it provides the tools needed for pattern recognition, data analysis, and decision-making. AI systems use mathematical concepts such as linear algebra, calculus, statistics, and probability to process data, identify trends, and make predictions. Calculus helps in optimizing and training models, while linear algebra is essential for data representation and transformations. Statistics allows AI to explore and understand data, making it a vital component in building effective AI models.

Q5. How is statistics used in real-life applications?

Statistics is used in numerous real-life applications to analyze data and make informed decisions. For instance, in sports, it helps predict player performance and game outcomes. In public health, statistics are used to track disease patterns and improve response strategies. Weather forecasting also relies on statistical analysis to predict conditions by comparing current data with historical trends. This allows for better preparation and planning in various fields, showcasing its importance in everyday decision-making.

Q6. Describe different types of probability events and their meanings.

Probability events can be categorized into certain, likely, unlikely, impossible, and equal probability events. A certain event is guaranteed to happen and has a probability of 1, such as the sun rising every day. A likely event has a high chance of occurring but is not guaranteed, while an unlikely event has a low chance. An impossible event, with a probability of 0, means it will never occur, such as drawing a red ball from a bag that only contains blue balls. Equal probability events are those where outcomes have the same chance, such as flipping a fair coin.

Q7. What are common real-life examples where probability is applied?

Probability is frequently used in everyday life, such as weather forecasting, where forecasters predict the likelihood of rain or other weather conditions. It is also used in traffic planning to estimate congestion based on time and location. Sports analysts apply probability to predict game outcomes or player performance. Additionally, businesses use probability to assess risks and make strategic decisions. These applications help people prepare for and manage uncertain outcomes effectively.

Q8. Why is data collection and analysis important in AI?

Data collection and analysis are crucial in AI because they provide the foundation for training and improving models. Data collection ensures that AI systems have relevant information to learn from, while analysis helps identify trends, clean data, and make it usable. This process allows AI models to develop more accurate predictions and insights. Effective data analysis ensures that the AI can understand and interpret the data, leading to better decision-making and problem-solving capabilities.

Q9. How is linear algebra used in AI applications?

Linear algebra is essential in AI for handling and transforming data, representing multi-dimensional data structures like matrices and vectors, and solving systems of linear equations. It enables AI algorithms to perform complex computations, such as image recognition and natural language processing, efficiently. Linear algebra helps AI models process large amounts of data, find relationships between variables, and make accurate predictions. This mathematical tool is fundamental for training neural networks and enhancing machine learning algorithms.

Q10. What are the steps involved in conducting statistical analysis?

Conducting statistical analysis involves several steps: first, data is collected from various sources. The next step is cleaning and exploring the data to remove inconsistencies and irrelevant information. Once the data is prepared, it is analyzed to identify patterns, trends, and relationships using statistical methods. Finally, conclusions are drawn, and decisions are made based on the findings. This systematic approach ensures that data is used effectively to inform strategies and improve outcomes.

Q11. How does AI recognize patterns, and why is this important?

AI recognizes patterns by analyzing large datasets and identifying consistent features or trends. This ability is crucial because it allows AI to learn from data and make decisions similar to human reasoning. For example, AI can identify objects in images, detect anomalies, and predict future events by recognizing patterns in past

data. Pattern recognition enables AI to perform tasks such as language translation, speech recognition, and predictive analytics, making it a powerful tool in many industries.

Q12. What does it mean when an event has a probability of 0 or 1?

An event with a probability of 1 is a certain event, meaning it will definitely occur. For example, the sun rising in the morning has a probability of 1. On the other hand, an event with a probability of 0 is considered impossible, meaning it will never happen, such as drawing a specific card from a deck that does not contain it. These probabilities help quantify the likelihood of outcomes and guide decision-making processes.

Q13. Why is statistics important for AI project development?

Statistics is important for AI project development because it allows for the collection, analysis, and interpretation of data. By using statistical methods, developers can identify patterns, measure performance, and make data-driven improvements to AI models. This helps ensure that AI systems are accurate, efficient, and capable of adapting to new information. Statistics also supports hypothesis testing and validation, which are essential for refining algorithms and making informed decisions during project development.

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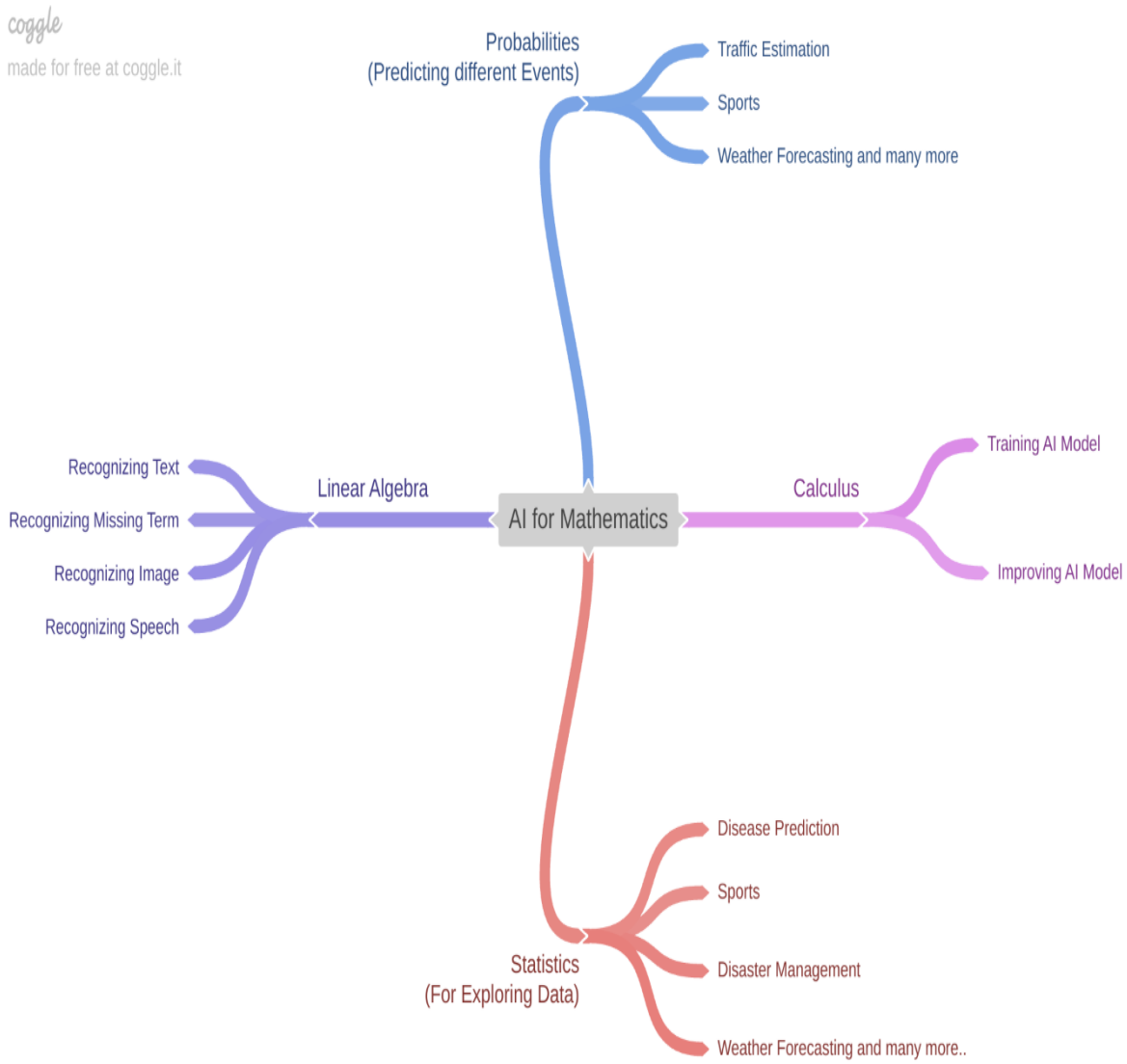
Mind Map


coggle
made for free at coggle.it
Probabilities
(Predicting different Events)
Traffic Estimation
Sports
Weather Forecasting and many more
Recognizing Text
Recognizing Missing Term
Recognizing Image
Recognizing Speech
Linear Algebra
AI for Mathematics
Calculus
Training AI Model
Improving AI Model
Statistics
(For Exploring Data)
Disease Prediction
Sports
Disaster Management
Weather Forecasting and many more..

Unit 4: Introduction to Generative AI

LEARNING OUTCOMES

- Students will be able to define Generative AI & classify different kinds.
- Students will be able to explain how Generative AI works and recognize how it learns.
- Applying Generative AI tools to create content.
- Understanding the ethical considerations of using Generative AI.

MAIN POINTS

Introduction to Generative AI

The term Generative AI encompasses an area of artificial intelligence responsible for content creation, including text, images, music, and even programming. In contrast to the traditional models of AI that solely focus on identifying patterns and decision-making, Generative AI can create original results depending on the data it is trained on.

Key Features of Generative AI:

• Produces new content such as text, images, and code

• Derives knowledge from extensive datasets like books, art pieces, and music compilation

• Employs deep learning models such as GPT, DALL•E, or Stable Diffusion

Generative AI vs Conventional AI

Generative AI	Conventional AI
Generative AI creates new content like images, text, or music	Conventional AI focuses on analyzing existing data and making predictions or decisions
Generative AI learns from data to generate new creations	Conventional AI learns patterns to make predictions or classifications.
Examples: ChatGPT, DALL·E, MidJourney	Examples: Siri, Alexa, recommendation systems

Types of Generative AI

Generative AI can be custom-tailored or categorized by the type of content that AI

creates.

1. Generation of text (ChatGPT, Google Bard)
2. Creation of images (DALL•E, MidJourney, Stable Diffusion)
3. Audio Generation. Composers of music or voice cloning technology.
4. Video Generation including AI video editors and deepfake technology.

Examples of Generative AI

• In the case of ChatGPT, it generates text that closely mimics the way a human talks.
• Dall-E generates pictures based on descriptive text prompts provided to it.
• Artistic photos are created by DeepDream.
• Under OpenAI, Jukebox creates music that is generated by AI.
• GitHub Copilot offers automatic assistance in crafting computer programs, and code.
• AIVA is capable of composing original music, working in multiple genres unlike traditional composers.

Benefits of Using Generative AI

✓ Boosts Creativity – Aids with writing, designing, or brainstorming related tasks.
✓ Saves Time – Creates content for documents, artwork, or programming, etc. autonomously.
✓ Personalization – Provides tailored suggestions for advertisements or learning materials.
✓ Enhances productivity – Aids in research, coding, and developing other content.
✓ Accessibility – Devices such as text-to-speech programs or AI assistants aid disabled users.

Limitations of Using Generative AI

✕ Bias in Output – The content created can be incorrect and/or biased based on the given data it has been trained on.
✕ Lack of Originality – Works uncreatively by repeating previously created content.
✕ Ethical concerns – Deceptive deep fakes and misinformation, among other things.

✕ High Computational Power Needed – Models can only run on powerful hardware, demanding high computational power.

✕ Job Displacement – Employment such as designing or writing, and other creative tasks may be taken away due to it.

Popular Generative AI Tools

Tool	Use Case
ChatGPT	Text generation, answering questions
DALL·E / MidJourney	AI-generated images
GitHub Copilot	AI-powered code assistant

What makes ethics important in generative AI tools

Generative AI raises important fairness, privacy and misuses of creating realistic text, and turning images and videos.

Important ethical concerns fixation:

1. Genuine fake content and potential misinformation

→ AI can create fake news. Deepfake videos or forged documents

→ Example: Deepfake video of a politician saying false things.

2. Discrimination or bias

→ This applies to bias on gender or race: AI learns from data o Example: AI tool for hiring admin tends to favor male candidates to female ones.

3. Breaches of Privacy

→ AI does possess the ability to conjure identities (real or fake) without permission.

→ Example Scams impersonating family and voice cloning.

4. Stealing intellectual Property (IP)

→ AI performing works of various artists or predictors without recognizing them. Example: An AI generated song using a celebrity voice.

5. Displaced employment

AI poses a strong risk to creativity, writing, customer service, designing and other

fields.

MULTIPLE CHOICE QUESTIONS

Q1. Generative AI primarily focuses on:

a) Analyzing data
b) Connecting to the internet
c) Solving math problems
d) Creating new content

Q2. Which is NOT a type of Generative AI?

a) Image recognition
b) Text generation
c) Music composition
d) Video synthesis

Q3. ChatGPT is an example of:

a) Text-generating AI
b) Conventional AI
c) Voice assistant
d) Robotics

Q4.A key difference between Generative AI and Conventional AI is:

a) Generative AI predicts, Conventional AI creates
b) Generative AI creates, Conventional AI analyzes
c) Both are the same
d) Generative AI only works offline

Q5. Which tool generates images from text?

a) DALL·E
b) GitHub Copilot
c) Google Search
d) Siri

Q6.A benefit of Generative AI is:

a) Always being 100% accurate
b) Automating content creation
c) Needing no internet
d) Working without data

Q7.A limitation of Generative AI is:

a) High creativity
b) Fast processing
c) Potential bias in outputs
d) Small file size

Q8. Ethical concern about Generative AI includes:

a) Creating original art
b) Spreading misinformation

c) Improving education
d) Helping doctors

Q9. Which is a text-generating AI tool?
a) MidJourney
b) GitHub Copilot
c) ChatGPT
d) Jukebox

Q10.Generative AI learns from:
a) Large datasets
b) User manuals
c) Random guesses
d) Weather reports

Q11.Conventional AI is used in:
a) Fraud detection
b) Writing novels
c) Painting
d) Songwriting

Q12.An example of audio-generating AI is:
a) DALL·E
b) Tesla Autopilot
c) Google Translate
d) Murf.ai

Q13.Generative AI CANNOT:
a) Write code
b) Compose music
c) Generate images
d) Understand emotions

Q14.A risk of AI-generated art is:
a) Using too many colors
b) Being too creative
c) Copyright infringement
d) Small file size

Q15.GitHub Copilot assists with:
a) Image editing
b) Writing code
c) Voice cloning
d) Video games

Q16.To use AI ethically, you should:
a) Share unverified content
b) Credit AI assistance
c) Create deepfakes
d) Hide AI use

Q17.Bias in AI outputs comes from:

a) Too much data
b) Fast processors
c) Biased training data
d) Small models

Q18.Which law regulates AI in Europe?
a) Digital India Act
b) AI Ethics Law
c) EU AI Act
d) Copyright Act

Q19.Generative AI is LEAST useful for:
a) Medical diagnosis
b) Writing essays
c) Creating logos
d) Composing music

Q20.A deepfake is:
a) AI-generated fake media
b) A fake dataset
c) A type of computer
d) An AI chip

ANSWERS

Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10
d	a	a	b	a	b	c	b	c	a
Q.11	Q.12	Q.13	Q.14	Q.15	Q.16	Q.17	Q.18	Q.19	Q.20
a	d	d	c	b	b	c	c	a	a

SHORT ANSWER QUESTIONS

Q1. Define Generative AI.

Answer: Generative AI is a type of artificial intelligence that can create new content, such as text, images, audio, and video, based on existing data.

Unlike traditional AI that analyzes data to make predictions or classifications, generative AI models learn from data and then generate new outputs that are similar to or even indistinguishable from the original data.

Q2. Name two Conventional AI tools.

Answer: Siri, Google Search

Q3. Give two example of text-generating AI.

Answer: ChatGPT, deepseek ,grok (any two)

Q4. How does DALL·E work?

Answer: Dall-E is an AI model that generates images from text descriptions. It's trained on a vast dataset of text-image pairs, allowing it to understand the relationship between words and visual elements. When you provide a text prompt, Dall-E analyzes the keywords and creates an image that visually represents the description

Q5. List two benefits of Generative AI.

Answer: Saves time, enhances creativity

- What is a key limitation of Generative AI?
  Answer: although Gen AI models appear to understand the content that they use and generate, they do not understand it.
- the data that Gen AI models use for training have lots of inaccuracies and biases in them already.
- Gen AI can also easily create fake news, misinformation and 'deep fakes'.

Q6. Name two AI tool for coding assistance.

Answer: GitHub Copilot, Tabnine, and Cursor AI (any two)

Q7. Why is plagiarism a concern with AI text?

Answer: Doing academic work requires that the work you turn in is your own. A paper that is written by AI is not considered your own original work. It doesn't matter which AI program/software you use. Using any of these to write your papers is considered a form of plagiarism.

Q8. What ethical issue arises from deepfakes?

Answer: Deepfakes raise a major ethical issue of misinformation and manipulation, leading to erosion of trust in media and public discourse. They can be used to create false narratives, damage reputations, and even interfere with elections. Beyond misinformation, deepfakes also pose risks to privacy, as individuals' likeness can be exploited without consent, and they can be weaponized for harm, blackmail, or revenge pornography.

Q9. How can bias enter AI systems?

Answer: This occurs when an AI system is overly reliant on pre-existing patterns in the data, reinforcing historical prejudices. For instance, if a hiring algorithm learns that past successful candidates were predominantly men, it may favor male applicants in the future.

Q10. What does GitHub Copilot generate?

Answer: The GitHub Copilot extension creates a contextual prompt by combining

your prompt with additional context including the code file open in your active document, your code selection, and general workspace information, such as frameworks, languages, and dependencies.

Q11. Why is verification important for AI content?

Answer: Verification of AI content is crucial for ensuring its accuracy, reliability, and ethical integrity. It helps prevent the spread of misinformation, protects intellectual property, and builds trust in the technology, especially in fields like education, law, and healthcare where the origin and reliability of information are vital.

Q12. Name two regulation for AI ethics.

Answer: Two regulations that address AI ethics are the EU AI Act and UNESCO's Recommendation on the Ethics of Artificial Intelligence. The EU AI Act sets rules for AI systems, including bans on high-risk applications and requirements for general-purpose models. UNESCO's Recommendation provides a global standard for AI ethics, emphasizing human rights and dignity, and including guidelines for diverse areas like data governance and education.

Q13. How does Generative AI help artists?

Answer: Generative AI assists artists by augmenting their creativity, allowing them to explore new ideas, experiment with different styles, and overcome technical limitations. It acts as a tool to generate variations on existing concepts, create new images, and even aid in music composition or writing.

Q14. What is Murf.ai used for?

Answer: Murf AI provides voice-overs with a great number of voice choices, each of them having multiple languages and accents. Typical use cases of the platform include voice-overs for video, presentations, e-learning modules, and audiobooks.v

Q15. Why might AI-generated job applications be unfair?

Answer: AI can exaggerate and sometimes lies. Make sure you don't claim credit for things you didn't do. If an employer discovers you've lied in your application form, you could be dismissed. Recruiters also use AI to assist with shortlisting and use plagiarism software.

Q16. What should students avoid when using AI for assignments?

Answer: Reframing the assignment type to accommodate creative displays for answering questions instead of written work can go a long way in helping students utilize their skills instead of depending on AI tools.

Q17. How can AI violate privacy?

Answer: generative AI tools trained with data scraped from the internet may

memorize personal information about people, as well as relational data about their family and friends. This data helps enable spear-phishing—the deliberate targeting of people for purposes of identity theft or fraud

Q18. What is the purpose of the Digital India Act (AI)?

Answer: Creating digital standards and laws regarding artificial intelligence (AI) and machine learning (ML) technology. With the inevitable takeover of AI and ML technology permeating through businesses, the Digital India Act wants to get ahead of the wave by focusing on one major aspect: accountability.

Q19. Give two ways to use AI responsibly.

Answer: Data Management: AI use must comply with laws and policies on data protection that ensure security, privacy, and interoperability. Responsible and Authorized Acquisition: AI acquisition must align with legal and policy requirements and address technical specifications, risk management, transparency, and sustainability.

Q20. Mention any 5 examples of generative AI.

Answer: Five examples are Midjourney, a platform that generates images from text prompts; Jasper, an AI writing assistant that helps create content; Synthesia, an AI video generator; Ada, a conversational AI app that provides medical guidance; and Tripnotes.ai, which uses AI to research places mentioned in travel inspiration.

LONG ANSWER TYPE QUESTIONS:

Q1. Compare Generative AI and Conventional AI with examples.

Answer:

Generative AI creates new content, like images or text, while conventional AI analyzes existing data and makes predictions. Traditional AI is like a chess player, following rules to make optimal moves within a defined system. Generative AI is more like a creative artist, generating original content based on learned patterns.

→*Generative AI* creates (e.g., ChatGPT writes essays).

→*Conventional AI* analyzes (e.g., spam filters detect junk mail).

Q2. Explain how DALL·E works and its applications.

Answer:

DALL-E is a generative AI model that creates images from text descriptions. It works by using a combination of deep learning techniques, including large language models (LLMs), diffusion processing, and natural language processing, to understand and generate visual content. It is essentially a digital artist that brings your words to life.

Q3. Discuss three benefits and two limitations of Generative AI.

Answer:

Generative AI offers benefits like boosting creativity by automating content creation and improving customer service with AI-powered chatbots. However, it also faces limitations like potential biases in the generated content and challenges in ensuring quality and accuracy

→*Benefits:* Faster content creation, personalized learning, 24/7 availability.

→*Limitations:* Bias, high computational costs.

Q4. Describe ethical concerns around deepfake technology.

Answer: Deepfake technology raises significant ethical concerns due to its potential for misuse and its impact on trust, privacy, and individual reputations. Specifically, deepfakes can be used to spread misinformation, damage reputations, and manipulate individuals for personal or political gain. They also raise questions about consent and the right to control one's own likeness and voice. so overall it is Misinformation, reputation harm, political manipulation, lack of consent.

Q5. How can Generative AI tools assist in education? Provide examples.

Answer:

ChatGPT for tutoring, DALL·E for visual learning, Copilot for coding practice.

Different AI tools can adjust math problem difficulty and type based on individual student performance, providing a tailored learning experience. Another example is the widely-known Duolingo, a language learning tool that uses AI to customize lessons to each learner's pace and skill level.

Q6. Why is bias a serious issue in Generative AI? Give examples.

Answer:

AI may reinforce stereotypes (e.g., gender bias in hiring tools). Bias in AI models typically arises from two sources: the design of models themselves and the training data they use. Models can sometimes reflect the assumptions of the developers coding them, which causes them to favor certain outcomes.

Q7. Explain how GitHub Copilot works and its advantages for developers.

Answer: GitHub Copilot is an AI coding assistant that uses an AI model, Codex, to help developers write code faster and with less effort. It integrates with various code editors and suggests code completions, entire functions, and even assists with documentation based on the context of your project.
It Suggests code snippets in real-time; speeds up coding, reduces errors.

Q8. "Generative AI poses job risks." Debate this statement.

Answer:

Risks to the enterprise. Gen AI introduces increased enterprise risk across data, applications, infrastructure, and processes. Our research shows some of the most prevalent are: Data privacy, security, and intellectual property risks

→*Yes:* May replace writers/designers.

→*No:* Creates new AI-related jobs.

Q9. Suggest five rules for ethical AI use in schools.

Answer: Five ethical rules for AI use in schools should prioritize student well-being, fairness, privacy, transparency, and accountability. These rules ensure AI tools are used responsibly and ethically, promoting equitable learning environments and protecting student data and rights or we can also say no plagiarism, fact-check outputs, credit AI help, avoid deepfakes, report bias.

Q10. How can governments regulate Generative AI effectively?

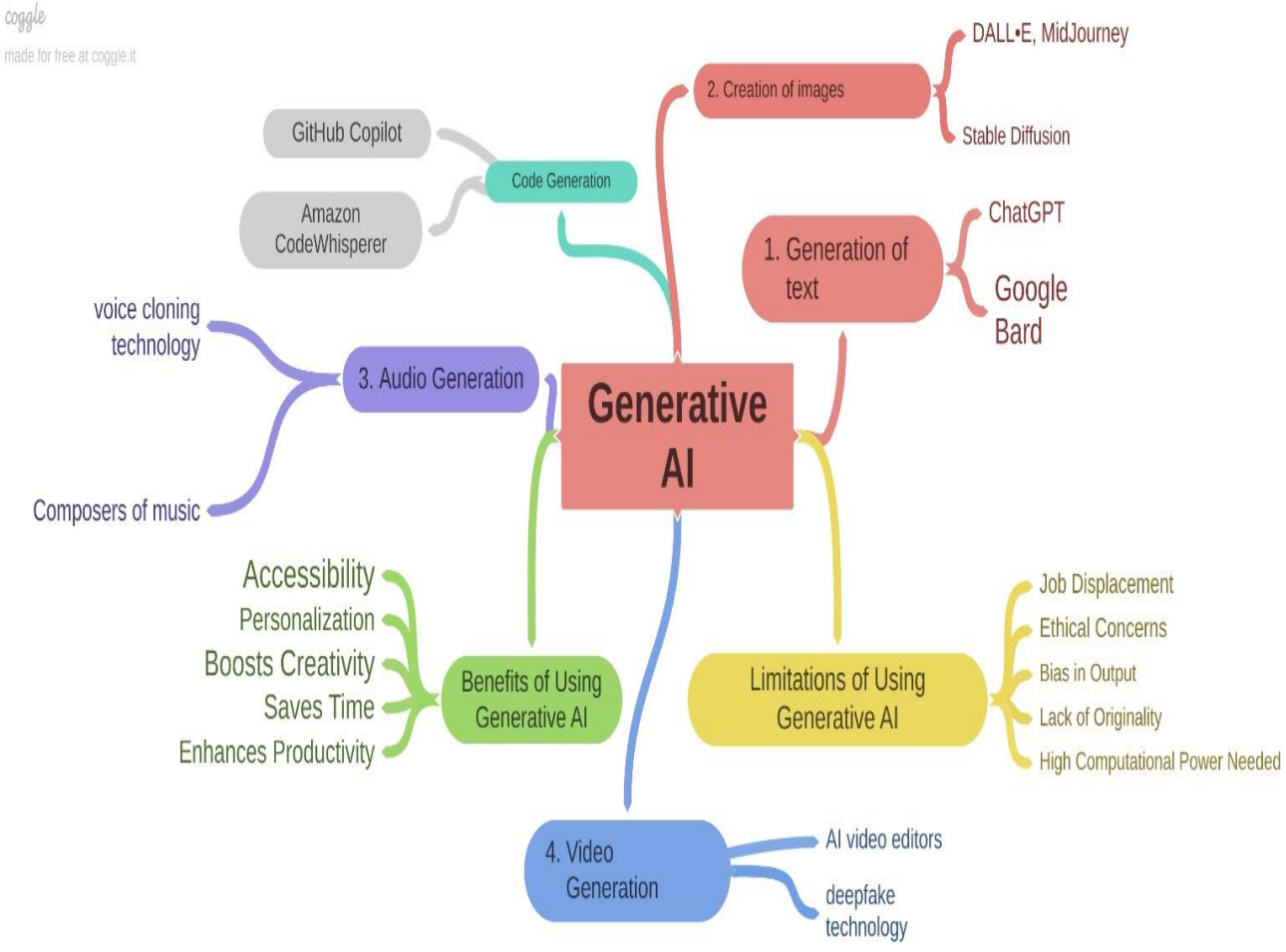
Answer: The legislation prioritizes safeguarding individual rights and ensuring fairness, aiming to make AI systems safer and more trustworthy. Its focus on consumer protection and ethical practices establishes high standards for system safety and accountability across member states. Also, we can say Ban harmful uses (deepfake scams), enforce transparency, promote fairness audits.

REFERENCE LINKS

https://cbseacademic.nic.in/web_material/Curriculum26/publication/secondary/AI_Facilitators_Handbook_IX.pdf

https://cbseacademic.nic.in/web_material/Curriculum26/sec/417-AI-IX.pdf

MIND MAP



Unit 5 - Introduction to Python

LEARNING OUTCOMES

- Learn basic programming skills through gamified platforms.
- Acquire introductory Python programming skills in a very user-friendly format.

MAIN POINTS

Introduction to Python Language

- Python is a high-level, interpreted programming language known for its simplicity and readability.
- Its easy syntax makes it beginner-friendly and allows developers to write clean and concise code.
- Python is portable and versatile, running on multiple platforms without requiring major changes.
- It is widely used in various fields such as web development, artificial intelligence, automation, data science, and more.

Python Programming & Applications

- Web Development
- AI & Machine Learning
- Data Analysis
- Automation (scripts)
- Game Development

Python Basics

Variables-Variables are symbolic names that refer to objects or values stored in your computer's memory, and they're essential building blocks for any Python program.

Eg: x=5, name="ZIET" Here **x** and **name** are variables.

Points to note:

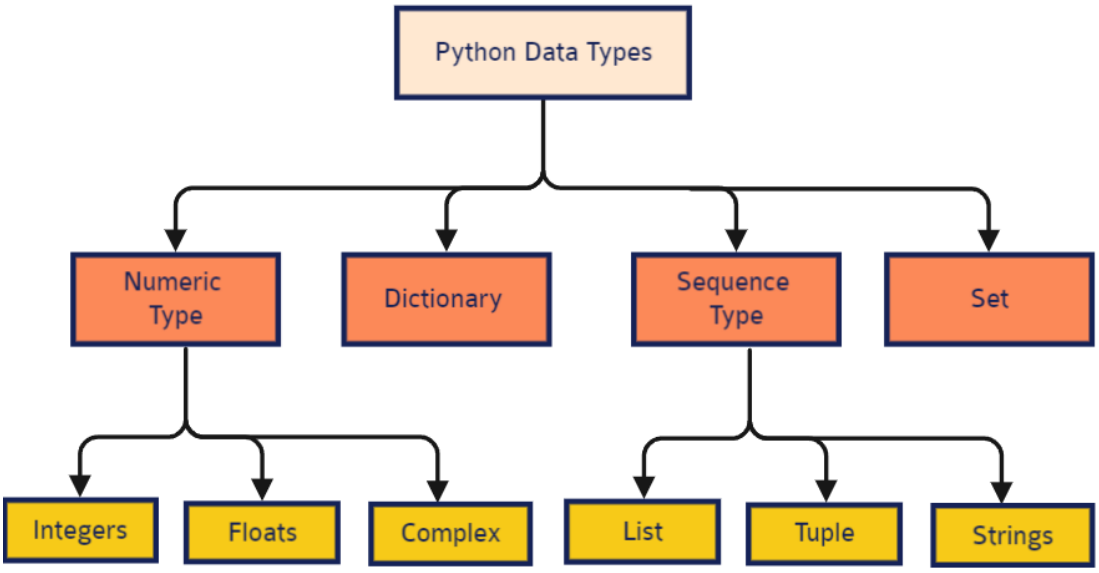
- You don’t need to declare the type of a variable in Python. It is automatically decided based on the value you assign.
- You can change the value of a variable any time.

- Variable names should be meaningful and follow rules

Rules for Naming Variables:

- Must start with a letter or underscore (_)
- Can include letters, digits, and underscores (e.g., AI_9)
- Cannot be a Python keyword (like if, for, else)
- Python is case-sensitive (Name and name are different)

Data Types–Every value in Python has a data type. Since everything is an object in Python programming, data types are actually classes and variables are instance (object) of these classes.



- **Integer (int)**:Used to store whole numbers (without decimal).

  Eg:145,4.78,-98
- **Float (float):**Used to store decimal numbers or numbers with a fractional part.
  Examples include 3.14, -0.5, 100.0.
- **String (str):** Used to store **text or characters**.
  Anything written inside **quotes** (single or double) is a string, like "rain" or '2025'.

Note: type( ) – This function is used to check the datatype of a given value or object.

Input/Output Operation	**Function**	**Purpose**	**Example**
Input	input()	Used to take data from the user.	name=input(“Enter your name”)
Output	print()	Used to show messages or results.	print(name)

Note:

- input () function always **takes input as a string** (even if you type a number).
- You can convert it to other types (like int or float) using type casting functions, if needed.

Operators

- **Arithmetic Operators**: These operators are used to perform basic mathematical operations.

Operator	Meaning	Expression	Result
+	Addition	5+7	12
-	Subtraction	52-9	43
*	Multiplication	4*3	12
/	Division	10/2	5.0
%	Remainder	20%3	2
//	Integer Division	13//3	4
**	Raised to power	2**3	9

- **Assignment Operators**: Assignment operators are used to assign values to variables and update their values.

Operator	Expression	Equivalent to
=	x=5	x = 5
+=	x +=5	x = x + 5
-=	x -= 5	x = x - 5
*=	x *= 5	x = x * 5
/=	x /= 5	x = x / 5

- **Comparison Operators**: Comparison operators are used to compare two values. They return either True or False.

Operator	Meaning	Expression	Result
>	Greater Than	20 > 10	True
		15 > 25	False
<	Less Than	20 < 45	True
		20 < 10	False
==	Equal To	5 == 5	True
		5 == 6	False
!=	Not Equal to	67 != 45	True
		35 != 35	False
>=	Greater than or Equal to	45 >= 45	True
		23 >= 34	False
<=	Less than or equal to	13 <= 24	True
		13 <= 12	False

- **Logical Operators**:

Operator	Meaning	Expression	Result
And	And operator	True and True	True
		True and False	False
Or	Or operator	True or False	True
		False or False	False
Not	Not Operator	not False	True
		not True	False

Expressions: An expression is a combination of values, variables, and operators that Python can evaluate to produce a result.

Eg: (a + b) /c

Type conversion

Type conversion in Python means changing the data type of a value from one form to another, such as converting an integer to a float or a string to an integer.

1. **Implicit Type Conversion**

In implicit conversion, Python automatically changes the data type during an operation when needed. This usually happens when combining two different types (like integer and float), and Python converts the value to a compatible type without the programmer writing extra code.

```
a = 5       # int
b = 2.5     # float
c = a + b   # Python converts a to float
print(c)    # Output: 7.5
```

2.**Explicit Type Conversion (Type Casting)**

In explicit conversion, the programmer manually changes the data type by using built-in functions like int(), float(), str(), etc. This is helpful when we want to ensure a value is in a specific type before using it in operations.

```
x = "10"
y = int(x)       # Convert string to integer
print(y + 5)     # Output: 15

a = 5
b = float(a)     # Convert int to float
print(b)         # Output: 5.0
```

Flow of Control

Flow of control means the order in which instructions are executed in a program. It helps in making decisions, repeating tasks, or choosing between options.

Conditional Statements- Conditional statements are used to perform different actions based on different conditions. They allow a program to make decisions and

execute certain blocks of code only if specific conditions are true.

if, if-else, if-elif-else

if-The if statement is used to **make decisions** in a program.

It tells the program to execute a block of code only if a certain condition is true.

```
if marks >= 33:
    print("Pass")
```

if-else-The if-else statement is used when you want to **choose between two options**.

- If the **condition is true**, the code under if runs.
- If the **condition is false**, the code under else runs.
- Only **one block** (if or else) will run

Example:

```
if marks >= 33:
    print("Pass")
else:
    print("Fail")
```

Loops- Loops are programming constructs that allow a block of code to be executed repeatedly as long as a certain condition is true.
For loop: A for loop is used to **repeat a block of code** for **each item** in a sequence (like a list, string, or range of numbers).

Eg: for i in range(3):	Eg: for i in “ART”:

print(i) **Output:** 0 1 2	print(i) Output: A R T

While loop: A while loop is used to repeat a block of code as long as a condition is true.

Eg:

```
count=1
while count < 4:
    print(count)
    count += 1
```

Output:

1
2
3

Python Lists

A list is a collection of items stored in a single variable.Lists are created using square brackets: [ ]

Example: Name=[“Sreethu”,“Gopan”,“Manju”]

Year=[2022,2023,2024,2025]

Positive index	**0**	**1**	**2**	**3**

Year	**2o22**	**2023**	**2024**	**2025**
Negative index	**-1**	**-2**	**-3**	**-4**

List Operations

Accessing element : Elements can be accessed using index in square bracket.

Year[0]->2022

Year[-2]->2023

Adding an element: Elements can be added using append() ,extend() or insert()

Eg:Year.append(2026) # adds single element at the end of the list.

Year.extend([2027,2028]) # adds multiple elements at the end of the list.

Year.insert(1,1990) # insert an element at mentioned index

Removing an element: Elements can be removed using remove (),pop() or del statement

Year.remove(2022) # removes the value 2022

Year.pop(1) # removes element at index 1

del Year[1] # removes element at index 1

Merging : Merging means joining two or more lists into one single list using + operator.

L1=[1,2,3] L2=[4,5]

L1 + L2 # gives [1,2,3,4,5]

Replication: Replication means repeating the content of a list or string multiple times using the * (asterisk) operator

3*L2 -> [4,5,4,5,4,5]

Slicing: Slicing means getting a part of the list (a sub-list) using index positions.

L=[1,2,3,4]

L[1:3] -> [2,3]

MULTIPLE CHOICE QUESTIONS

Q1. Which of the following is a correct variable name in Python?

A) AI-417 B) 417-AI C) AI_417 D) AI@417

Q2. What is the output of: print(4 + 28* 2)?

A) 60 B) 64 C) 30 D) 44

Q3. Which function is used to display output in Python?

A) output() B) show() C) print() D) display()

Q4. What is the correct syntax to create a list in Python?

A) {1,2,3} B) (1,2,3) C) [1,2,3] D) "1,2,3"

Q5. What will input() return in Python?

A) Integer B) Float C) String D) Boolean

Q6. Which operator is used for exponentiation in Python?

A) ^ B) ** C) ^^ D) exp()

Q7. Which data type would be suitable for storing marks like 89.5?

A) int B) float C) str D) bool

Q8. To find square of 7 which of the statement(s) is/are true?

A) 7^2 B) 7**2 C) 7*7 D) Both B and C

Q9. Which of the following is a comparison operator?

A) += B) // C) = = D) **

Q10. Logical operators in Python include:

A) and , or, not B) <,>,!= C) plus, minus, not D) if, else

Q11. What will be the output of: print("5" + 5)?

A) 10 B) 55 C) Error D) 5 + 5

Q12. Which of the following is a string?

A) 5 B) "5" C) '5' D) Both B and C

Q13. What is the purpose of int() in Python?

A) Convert to float B) Convert to boolean
C) Convert to string D) Convert to integer

Q14. Which function is used to take input from the user?

A) input() B) scan() C) take() D) get()

Q15. Ruby is learning Python and wants to store the value 10 in a variable named num. Which operator should she use to do this correctly?

A) = = B) := C) = D) =>

Q16. What will be the output of: print(100 > 50 and 21 < 111)?

A) True B) False C) Error D) None

Q17. Which of the following can be used as a variable name?

A) if B) var C) for D) else

Q18. **Assertion (A):** The output of print(type(25.0)) is <class 'float'>.
Reason (R): In Python, any number with a decimal point is considered as float data type.
A) Both A and R are true, and R is the correct explanation of A
B) Both A and R are true, but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

Q19. Python files have the extension:

A) .pt B) .java C) .py D) .txt

Q20. What does the expression 5 != 3 evaluate to?

A) Error B) False C) True D) None

Answers:

1.C	2.A	3.C	4.C	5.C	6.B	7.B	8.D	9.C	10.A
11.C	12.D	13.D	14.A	15.C	16.A	17.B	18.A	19.C	20.C

SHORT ANSWER TYPE QUESTIONS

Q1. What is Python? Mention any two features of Python.

Ans: Python is a high-level, interpreted programming language that is easy to learn and use.

Features:

- Simple and readable syntax
- Open-source and freely available

Q2. What is the use of the input() function in Python?

Ans: The input() function is used to take user input from the keyboard. It always returns the input as a string.

Q3. What are variables in Python? Give one example.

Ans: Variables are containers used to store data values.

Example: age = 15 assigns the value 15 to the variable age.

Q4. Write the difference between = and == in Python.

Ans:

- = is the assignment operator used to assign values (e.g., x = 10)
- == is the comparison operator used to compare two values (e.g., x == 10 and return True or False)

Q5. Sunitha wrote the following code to store names of her classmates and print the last one:

```
stud= ["Sree", "Jyo", "Manvith"]

print(stud[3])
```

a) Identify the error in the code.

b) Correct the code and explain the reason.

Ans: a) Error: IndexError because index 3 does not exist.

b) Correct code:

```
print(stud[2])
```

Explanation: List indexing starts from 0, so the last element is at index 2.

Q6. What is type conversion? Write one example.

Ans: Type conversion is the process of converting one data type to another.
Example: int("10") converts the string "10" to the integer 10.

Q7. Rewrite the program after removing syntax errors:

```
a=90
s=input(“Enter a number”)
Print s+a
```

Ans: a=90

```
s=int(input(“Enter a number”))
print(s+a)
```

Q8. Mention two data types used in Python with examples.

Ans:

- int: Used to represent whole numbers (e.g., x = 5)
- float: Used to represent decimal numbers (e.g., pi = 3.14)

Q9. Write any four arithmetic operators and give their function.

Ans:

- + : Addition
- * : Multiplication
- - : Subtraction
- / : Division

Q10. How do you add and remove items from a list in Python?

Ans:

- To add: list.append("item")
- To remove: list.remove("item")

LONG ANSWER TYPE QUESTIONS

Q1. Write python code for following:

i) Python Program to find the area of a rectangle.

ii) Construct a logical expression to represent each of the following condition

a)Score is greater than or equal to 80 but less than 90.

b) Answer is either "N" or "n".

Ans:

```
i) length = float(input("Enter the length of the rectangle: "))
  width = float(input("Enter the width of the rectangle: "))
  area = length * width
  print("Area of the rectangle is:", area, "sq. units")
ii) a)score >= 80 and score < 90
    b) answer == "N" or answer == "n"
```

Q2. What are variables? What types of data are represented by the following:
[4, 6, 8], 7.8,250, "PMSHRI"?

Ans:A **variable** is a name or identifier used to store data values in a program. It acts as a container that holds information which can be used and modified during the execution of a program.

Types of data:

- [4, 6, 8] → **list** (a collection of integers)
- 7.8 → **float** (a decimal number)
- 250 → **int** (a whole number).
- "PMSHRI" → **string** (a sequence of characters)

Q3. Consider the following code

```
a = 10
b = 20
if a > 5 and b < 30:
   print("Both conditions are True")
else:
   print("Condition is False")
```

a) Which are the different operators used in the code?
b) What is the output of the above code?
c) Change the condition to make the output "Condition is False"
d) Explain how the and operator works in this context.

Ans:

a) > , < ,and ,=
b) Output: Both conditions are True
c)if a > 5 and b > 30:
d)The and operator returns True only if both conditions are True

Q4. Riya is writing a Python program to calculate the total cost of 5 pens. She wants the user to enter the price of one pen and then display the total cost using the input() and print() functions.
Answer the following questions based on this case:
a. Write a Python statement using input() to get the price of one pen from the user. (1 mark)

b. Which data type should the input be converted to before performing multiplication? Why? (1 mark)

c. Complete the code to calculate and print the total cost of 5 pens. (2 marks)

Ans:

a)price = input("Enter the price of one pen: ")

b)The input should be converted to float (or int) because mathematical operations like multiplication can only be done with numbers, not strings.

c)price = float(input("Enter the price of one pen: "))

total_cost = price * 5

print("Total cost of 5 pens is:", total_cost)

Q5. Write the output of the following statement. Also mention the operator type used in each.

a. 5**6

b. 12>=12

c. True and False

d. 12%5

Ans:

a)5**6 - 30, Arithmetic operator

b)12>=12 - True, Comparison/Relational operator

c)True and False - False, Logical operator

d)12%5 - 2, Arithmetic operator

SAMPLE PRACTICAL QUESTIONS

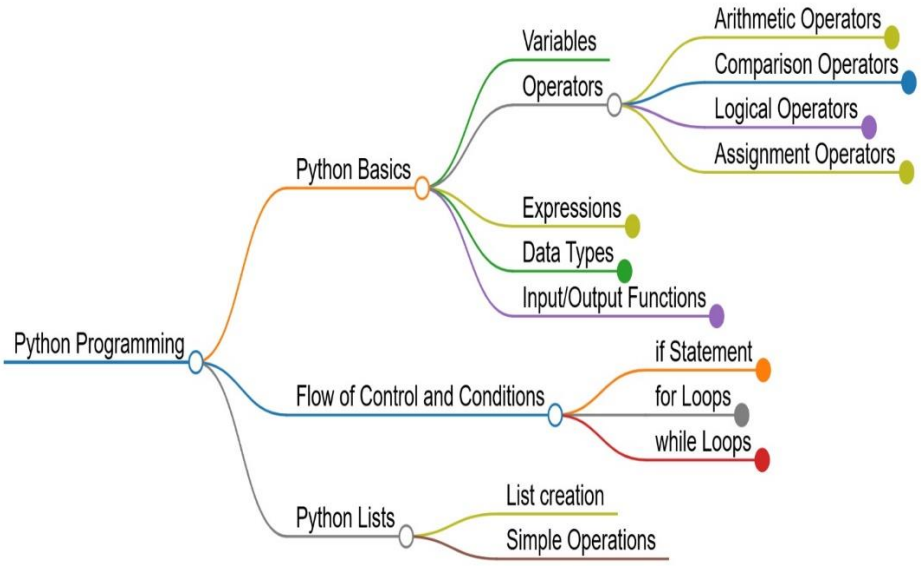
1. Write a program to accept a number and check whether it is divisible by 12.
2. Write a program to find whether a person is eligible for vote or not
3. Write a program to find numbers which are multiple of 5 between 1000 and 2000
4. Write a program to print all even numbers between 10 and 50
5. Write a program to accept a list and print all the elements one by one.
6. Write a program to accept a list and perform the following tasks on the list .
   a) Print the whole list
   b) Delete the last element from the list
   c)Add a new element at the end
   d) Remove the item which is at the second position

REFERENCE LINKS

● https://cbseacademic.nic.in/web_material/Curriculum21/publication/secondary/Python_Content_Manual.pdf

●https://drive.google.com/drive/folders/1qRAckDculA5i164OUFDlilxb8mT65MMb

MIND MAP



INTERACTIVE ASSESSMENT LINKS

Sr.No	Unit Name	Link
1	Part A - Unit 1 - Communication Skills - I	https://forms.gle/ovwGfA4xexa2iNE47
2	Part A - Unit 2 - Self Management Skills - I	https://forms.gle/Fp4tVrmqatAyoHBNA
3	Part A - Unit 3 - ICT Skills - I	https://forms.gle/63iLFRyrmgcET9996
4	Part A - Unit 4: Entrepreneurial Skills-I	https://forms.gle/52XK1Q2xYz5Gp1jX9
5	Part A - Unit 5: Green Skills-I	https://forms.gle/kH1TVZ2rXM7bKKFd6
6	Part B - Unit 1: AI Reflection, Project Cycle and Ethics	https://forms.gle/QoagfLWnvEZbwjeh7
7	Part B - Unit 2: Data Literacy	https://forms.gle/apJoDQEQ2ukFKb2F6
8	Part B - Unit 3: Math for AI (Statistics & Probability)	https://forms.gle/7g1LgecC2pxuWecU8
9	Part B - Unit 4: Introduction to Generative AI	https://forms.gle/wSmJLtQKasWj33uX8
10	Part B - Unit 5: Introduction to Python	https://forms.gle/mFPkA1WWv8SFPmBr7
11	Sample Question Papers	AI SQP 3 WITH ANS KEY AI SQP 2 WITH ANSWER KEY AI SQP 1 WITH ANS KEY

END