LOGICAL REASONING 1

Reasoning:

- Aimed at diagnosing the thinking capacity of students
- Seeking the accurate explanation is a part of logical thinking
- Logic: Applying principles to obtain valid inferences

Analytical Reasoning:

The act of carefully considering a problem, claim, question, or situation to determine the best solution.

- Seeing things from one's viewpoint– can be subjective as well

LOGICAL REASONING:

Adopting a completely rational approach to solve a problem, with no chance of ambiguity.

Approaches to Solve a Problem:

Inductive and Deductive Approaches

- Similarly, here are three types of logical reasoning:

  1) Deductive Reasoning
  2) Inductive Reasoning and
  3) Abductive Reasoning

- **STATEMENT**: A sentence that can either be true or false

✓ Example: "The ball is in the bag"

✓ N.B: Not all sentences are statements

✓ Eg: "Please close the door"

- **ARGUMENT**: A group of statements including one or more premises and one and only conclusion. There can be Inductive & Deductive Arguments as well
- **PREMISE**: An argument that provides some basic reason or support to get the conclusion. There can be one or more premise in a single argument
- **CONCLUSION**: It indicates what the arguer is trying to prove.

✓ There can be only one valid conclusion in a single argument

DEDUCTIVE REASONING

- Deductive reasoning starts with general premises or theories and uses them to reach a specific, certain conclusion.
- Top-down approach
- a=b, b=c, therefore, a=c
- Statements: Maya is a pianist
  Pianists are creative.
  Conclusion: Maya is creative
- **Validity and Soundness:**

✓ A deductive argument is valid if the conclusion logically follows from the premises.

✓ It's sound if it's valid and the premises are true.

- **Certainty**:

✓ Deductive reasoning provides certainty

✓ If the premises are true and the argument is valid, the conclusion must be true.

- **Examples**

✓ Statements: All students in the math club knows calculus.
Alex is a student in the math club.
Conclusion: Therefore, Alex knows calculus.

✓ Statements: All students who study regularly get good grades.
Saina is a student who studies regularly.
Conclusion: Therefore, Saina will get good grades..

- Statements: All marathon runners are dedicated.
  Sarah is a marathon runner.
  Conclusion: Therefore, Sarah is dedicated.

Deductive Reasoning/Inference

<u>Immediate Inference</u>

- Conclusion is drawn from a single statement
- Original premise: All humans are mortal.
  Immediate inference: Some mortals are humans.

<u>Mediate</u>

- Conclusion is drawn from two statements, called syllogism
- Premise 1: All men are mortal.
  Premise 2: Socrates is a man.
  Mediate inference: Therefore, Socrates is mortal.

INDUCTIVE REASONING

- Inductive reasoning starts with specific observations or data and uses them to derive general principles or conclusions.
- Bottom-up approach

- Statements: Mickey, who is a chef, is skilled in baking.
  Emily, who is a chef, is skilled in baking.
  David, who is a chef, is skilled in baking.
  Conclusion: Chefs are skilled in baking.
- **Probabilistic**: Inductive conclusions are not certain; they are probabilistic, meaning they are likely but not guaranteed to be true.
- **Specific to General**: In inductive reasoning, if numerous observed instances show a pattern, the conclusion is that the pattern likely applies more broadly.
- **Everyday Decision Making**: Inductive reasoning is common in everyday decision making, where we use past experiences to make assumptions about future events.
- **Examples**

✓ Statements: My aunt is a doctor.
She is compassionate.
Conclusion: All doctors are compassionate.

✓ Statements: The first book on my shelf is a mystery novel.
The second book on my shelf is a mystery novel.
Conclusion: Therefore, all the books on my shelf are mystery novels.

Inductive Reasoning	Deductive Reasoning
• Greeshma ma'am is mortal. • Aparna ma'am is mortal. • Indu ma'am is mortal. • Therefore, all Vallath Paper 1 teachers are mortal.	• All Vallath Paper 1 teachers are mortal. • Manu sir is a Vallath Paper 1 teacher. • Therefore, Manu sir is mortal.

Story: The Case of the Whispering Gallery

Sherlock Holmes and Dr. John Watson stood in the opulent ballroom of Lord Ashcroft's mansion, immersed in a whirlwind of masked guests, shimmering gowns, and intricate costumes. The occasion was the annual masquerade ball, a glamorous event attended by London's elite. Holmes, his piercing gaze behind the mask, turned to Watson. "Watson, observe the peculiar atmosphere tonight. There's an air of tension, hidden beneath the veneer of celebration." Watson, always eager to learn from Holmes' observations, followed his lead. "What do you suspect, Holmes?" Holmes leaned in, his voice barely above a whisper. "Take note of the whispers, Watson. An unusual number of guests are huddled together, conversing in hushed tones, their expressions a mix of anxiety and intrigue." As they mingled, Holmes and Watson discreetly gathered snippets of conversations. They heard murmurs of debts, secret liaisons, and hidden rivalries. Suddenly, a piercing scream cut through the ballroom. The guests turned to see Lady Isabella Marlowe, her face contorted in terror, pointing to a darkened corridor. "He's gone! Lord Ashcroft has disappeared!" Holmes' eyes gleamed with excitement. "Come, Watson, the game is afoot." They followed the trail of concerned guests to a dimly lit corridor known as the Whispering Gallery – an arched passageway where voices carried mysteriously from one end to the other.

Holmes examined the scene, his mind working furiously. "Watson, what do you make of this?" Watson glanced around. "It's an eerie place, Holmes. But how does it connect to Lord Ashcroft's disappearance?" Holmes smiled. "Abductive reasoning, my dear Watson. We must consider the facts. Lord Ashcroft was last seen entering this gallery, and his voice was heard in a whispered conversation just before he vanished." Watson's eyes widened. "Are you suggesting foul play within the gallery itself?" "Indeed, Watson. Think about the acoustics of this gallery – how a whisper can be magnified. What if Lord Ashcroft's voice was carried to an unintended audience?" Holmes proceeded to examine the walls, tapping them thoughtfully. He stopped at a particular spot and turned to Watson. "The stone here is slightly hollow. A hidden chamber, perhaps?" With Watson's assistance, Holmes located a hidden panel. Inside, they discovered a small chamber, and there, bound and gagged, was Lord Ashcroft. Holmes freed the distressed Lord Ashcroft and returned to the ballroom, where the commotion had subsided. Holding a microphone, Holmes addressed the guests. "Ladies and gentlemen, fear not. Lord Ashcroft has been located and is safe. The mystery of his disappearance was one of misdirected sound." Holmes explained his deduction – how Lord Ashcroft's whispered words had carried to an unintended listener in the hidden chamber, who sought to take advantage of the situation. Amid gasps and nods of realization, Holmes turned to Watson with a satisfied smile. "Abductive reasoning, Watson. By considering the unusual, we arrived at the improbable truth." Watson chuckled. "Indeed, Holmes. Once again, you've unraveled a seemingly inexplicable puzzle."

And so, amidst the grandeur of the masquerade ball, Sherlock Holmes demonstrated the power of abductive reasoning in uncovering the hidden secrets of the Whispering Gallery and rescuing Lord Ashcroft from a most unconventional predicament.

ABDUCTIVE REASONING

- Educated guess
- You take a set of observations and use a theory to explain them.
- Very similar to how doctors work on patients by taking symptoms to make a diagnosis.
- The fictional detective Sherlock Holmes often employs abductive reasoning to solve mysteries
- Useful when no clear information is available on a phenomenon
- Aims to find the most plausible explanation for a given set of observations or facts.
- It involves generating possible explanations that might not be immediately obvious, requiring creative thinking. (Hypothesis generation)
- Abductive conclusions are often probabilistic
- It considers a wide range of evidence and context to arrive at a coherent and comprehensive explanation
- Abductive reasoning can lead to incorrect conclusions if alternative explanations are not thoroughly considered, and it relies heavily on the available evidence.

Q & A

- In a deductive argument, conclusion is

A. Summing up of the premises.

B. Not necessarily based on premises.

C. Entailed by the premises.

D. Additional to the premises.

- The first cookie I tasted is chocolate chip. The second cookie I tasted is chocolate chip. Conclusion: Therefore, all the cookies in the jar are chocolate chip cookies.

  This is an example of _____ reasoning

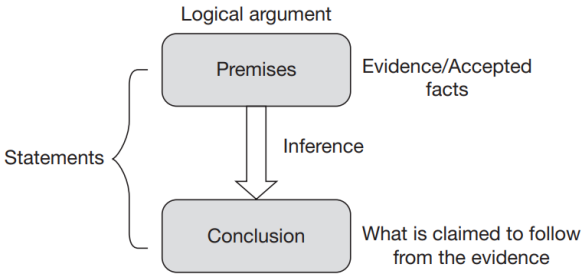
A. Inductive

B. Deductive

C. Abductive

D. None of the above

STRUCTURE OF AN ARGUMENT



Premises:

- Present the foundational statements or premises that serve as the basis for your argument.
- Premises should be relevant, accurate, and clearly stated.

Conclusion:

- Clearly state the logical conclusion that follows from the provided premises.
- The conclusion should logically flow from the premises and be directly related to them.