Thinking

Nature & Process
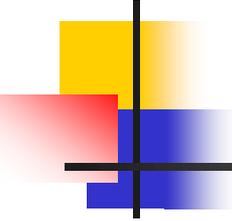
Thinking

- Thinking is the base of all cognitive activities or processes and is unique to human beings.

- It involves manipulation and analysis of information received from the environment.
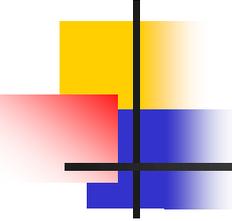
Thinking

- Therefore, thinking is a higher mental process through which we manipulate and analyze the acquired or existing information.

- Such manipulation and analysis occur by means of abstracting, reasoning, imagining, problem solving, and decision making.
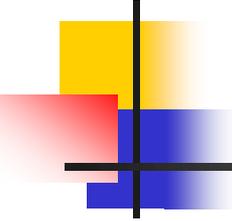
Thinking

- Thinking is mostly organized and *goal directed*.

- Thinking is an *internal mental process*, which can be inferred from overt behaviour.
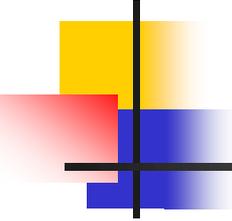
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- Thinking relies on knowledge we already possess. Such knowledge is represented either in the form of mental images or words. People usually think by means of mental images or words.
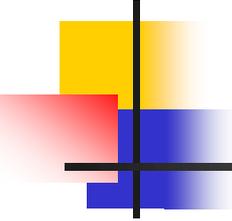
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The Process of Thinking

- Problem solving is thinking that is *goal directed*.

- Problems are not always in the form of obstacles or hurdles that one faces. It could be any simple activity that you perform to reach a defined goal.
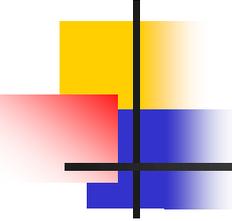
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- In problem solving, there is an initial state (the problem) and there is an end state (the goal).

- These two anchors are connected by means of several steps or mental operations.
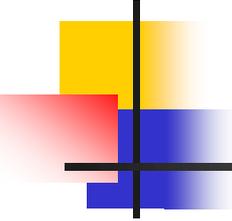
Mental Operations Involved in Solving a Problem

- Identify the problem
- Represent the problem
- Plan the solution; set sub-goals
- Evaluate all the solutions
- Select one solution and execute it
- Evaluate the outcome
- Rethink and redefine the problems and solutions
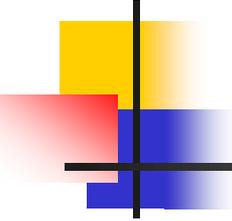
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Obstacles to Solving Problems

- **Mental Set** – mental set is a tendency of a person to solve problems by following already tried mental operations or steps.

- Prior success with a particular strategy would sometimes help in solving a new problem.
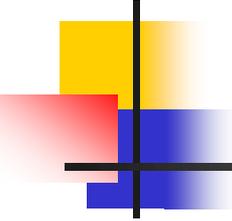
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- However, this tendency also creates a mental rigidity that obstructs the problem solver to think of any new rules or strategies.

- Thus, while in some situations mental set can enhance the quality and speed of problem solving, in other situation it hinders problem solving.
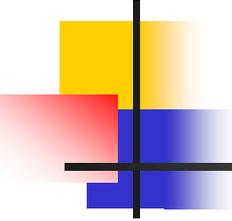
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- In day-to-day activities, we often rely on past experiences with similar or related problems.

- Another obstacle in problem solving is functional fixedness. **Functional fixedness** occurs when people fail to solve a problem because they are fixed on a thing's usual function.
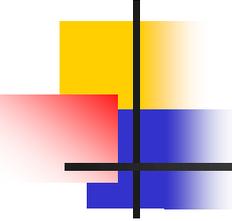
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Exercise

- There are 3 bottles A, B, and C which can hold a specified amount of water. The task is to get a desired amount of water with the help of these 3 bottles only.
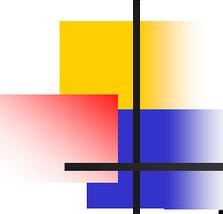
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Required Quantity	A	B	C
100	21	127	3
99	14	163	25
5	18	43	10
21	9	42	6
31	20	59	4
20	23	49	3
25	28	76	3
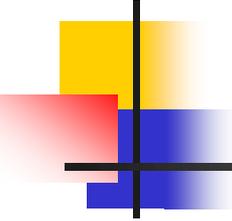
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- **Exercise:** Without lifting your pencil from paper, connect all nine dots by drawing four straight lines.

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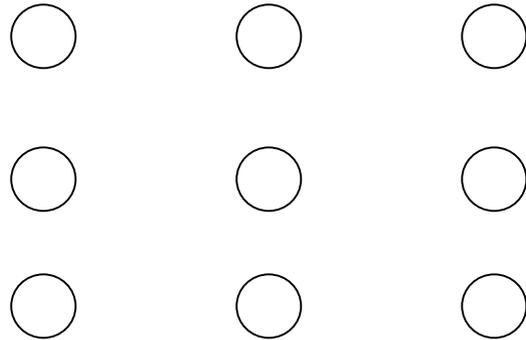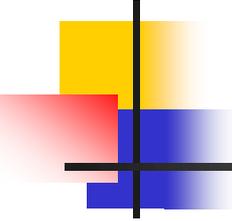
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- **Lack of Motivation** – people might be great at solving problems, but all their skills and talents are of no use if they are not motivated.

- Sometimes people give up easily when they encounter a problem or a failure in implementing the first step.
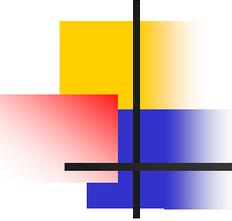
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- Thus, mental set, functional fixedness, lack of motivation and persistence are some of the major hindrances for effective problem solving.
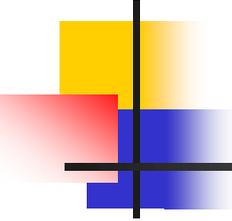
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Reasoning

- Reasoning is the process of gathering and analyzing information to arrive at conclusions.

- In this sense, reasoning is also a form of problem solving. The goal is to determine what conclusion can be drawn from certain given information.
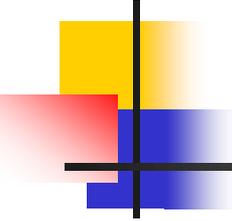
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- People use reasoning primarily in two ways: drawing specific conclusions based on general observations or drawing general conclusions based on specific observations.
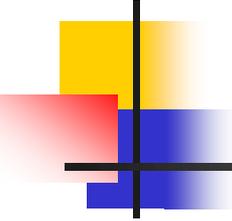
Thinking

Exercise

- If you find a person desperately running on the railway platform, what conclusion do you draw?
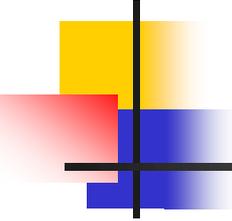
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- **Deductive Reasoning** – The kind of reasoning that begins with an assumption is called deductive reasoning.

- Deductive reasoning begins with making a general assumption that you know or believe to be true and then drawing specific conclusion based on the assumption.
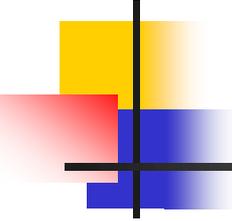
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- This type of reasoning is from general to particular. The mistake that can occur in this type of reasoning is that one assumes but doesn't always know if the basic assumption is true or not.

- For example, all cats have four legs. Rats have four legs. Therefore, rats are cats.
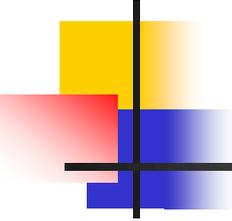
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- **Inductive Reasoning** – Reasoning that is based on specific facts and observations, is called inductive reasoning.

- Inductive reasoning is drawing a general conclusion based on particular observation. For example, Newton's conclusion after observing the falling apple from a tree.
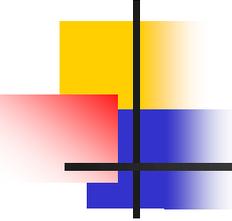
Thinking

- The mistake that one can commit in this type of reasoning is jumping to a conclusion without knowing all possible facts.

- Most cases of scientific reasoning are inductive in nature.
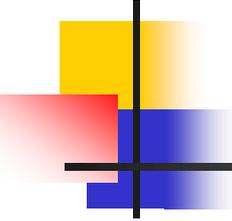
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Decision Making

- Decision making is all about making judgments. Inductive and deductive reasonings allow us to make judgments.

- In *judgment*, we draw conclusions, form opinions, evaluate events & objects, based on knowledge and evidence.
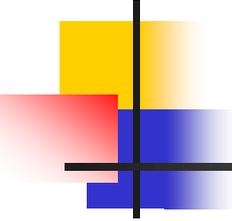
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- Sometimes, judgments are automatic and require no conscious effort by the person and occur as a matter of habit. For example, applying brakes on seeing the red light.
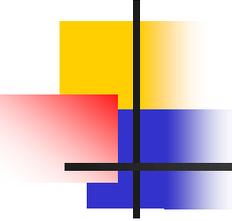
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- However, all the judgments are not so simple. Evaluating a book, judging the beauty of a painting, judging the suitability of a candidate for a particular post – are situations which require a great deal of effort and expertise on the part of the individual.
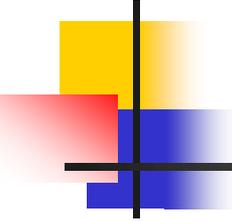
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- In decision making, the problem before us is to choose among alternatives by evaluating the cost and benefit associated with each alternative.
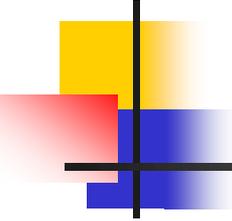
Thinking

- Decision making differs from other types of problem solving. In decision making, we already know the various solutions or choices and one has to be selected.