



# AI Theories

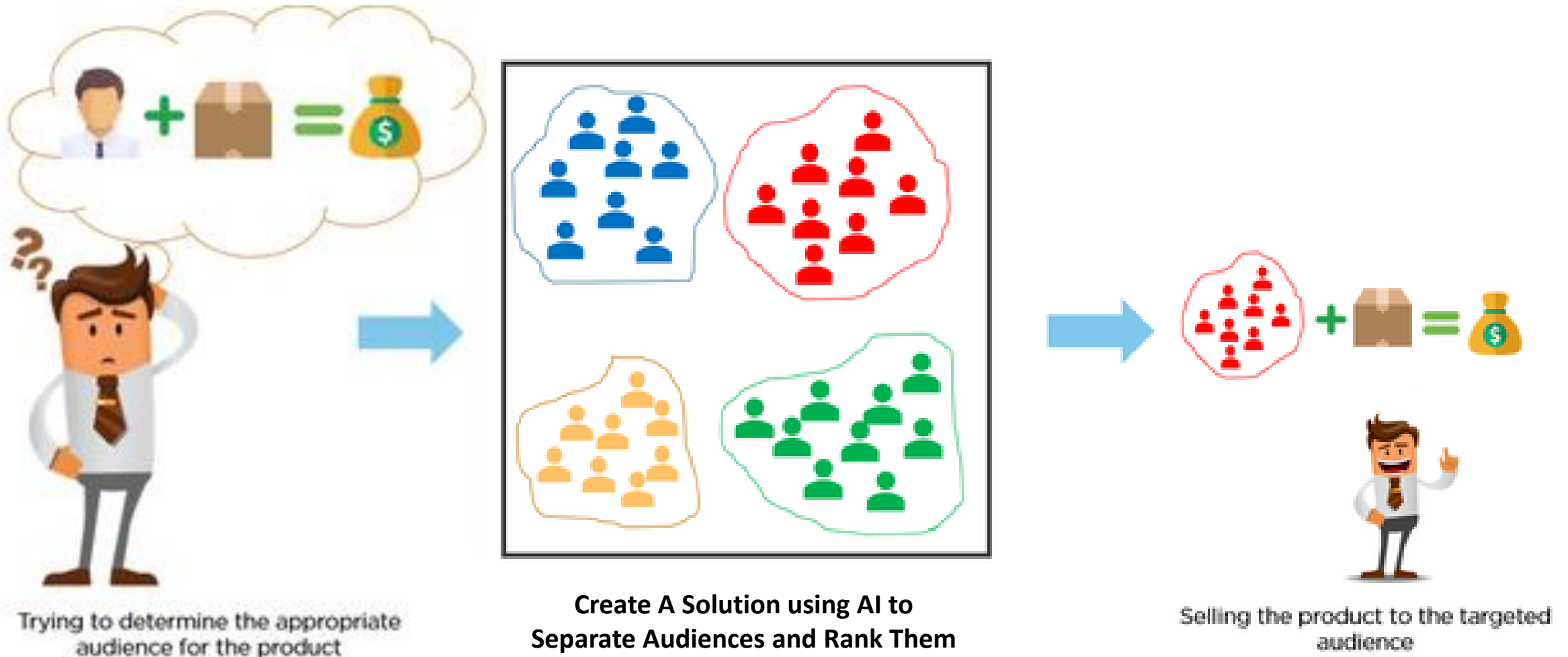
Lesson 2: Decision making process using AI

Topic : Critical thinking & Analytical thinking for Decision Making

# Art of Decision Making

Problem Solving, Critical thinking and Analytical thinking

# Objective: Create a Solution for decision making



# Objective: Create a Solution for decision making



Create A Solution using AI to  
Separate Audiences and Rank Them



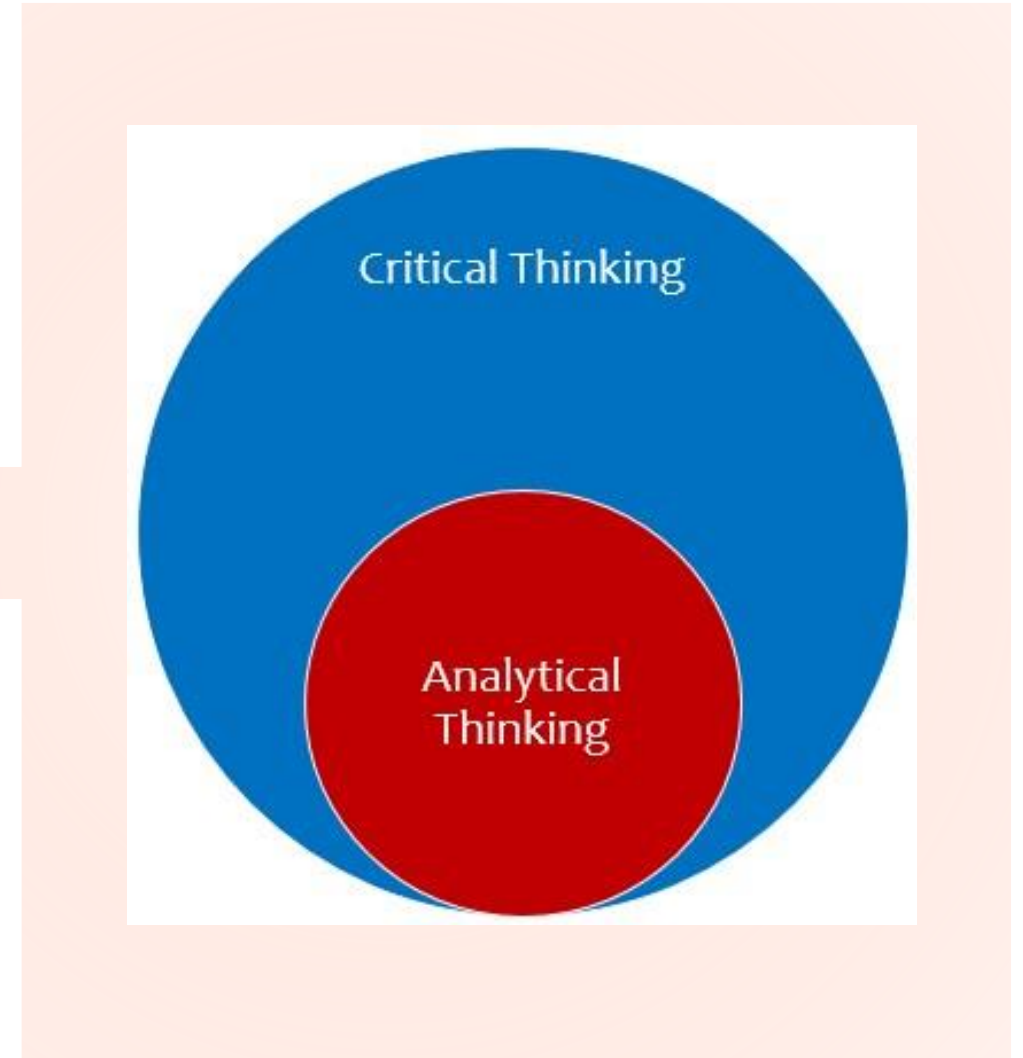
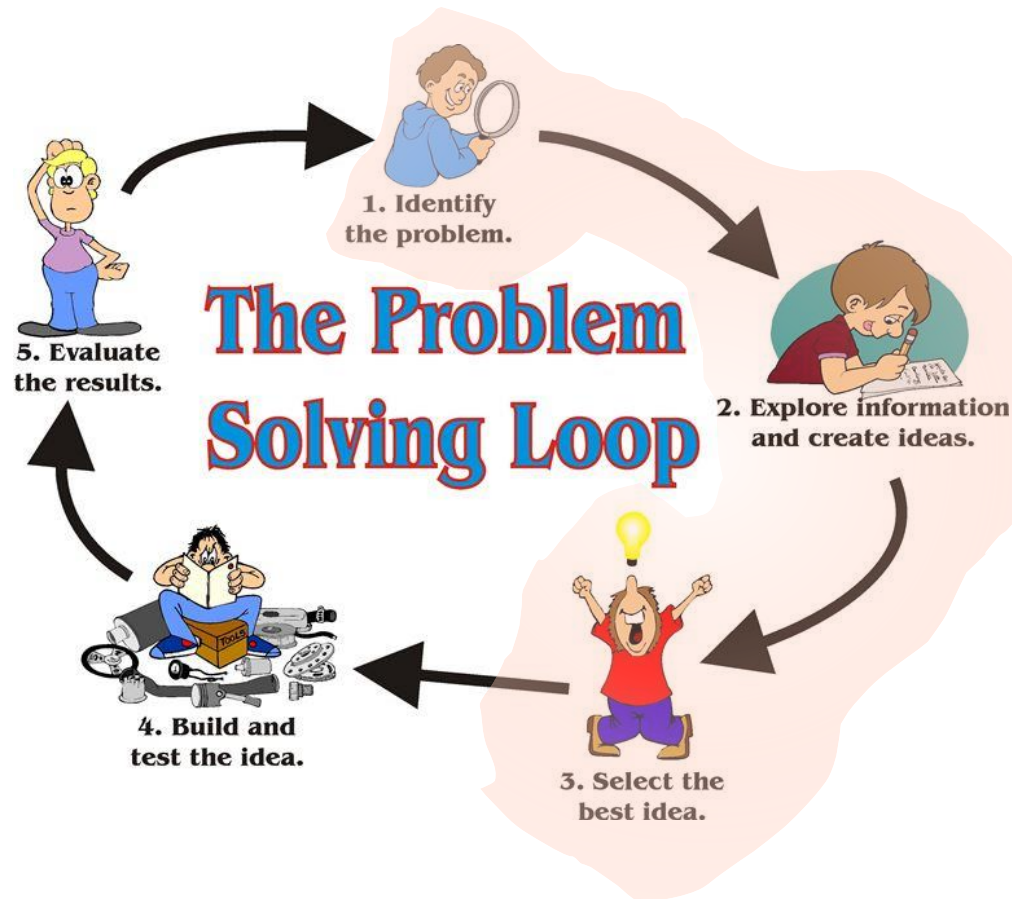
## Problem

Sort the most effective group  
How to sort it?

## Solution Process

## Decision → Action

# To make best decision you have to go through problem solving loop







**Make it a  
habit.**

Solving Problem  
performing Critical  
thinking and  
Analytical thinking

# Data Analysis Can be Misleading



## Critical Thinking, Analytical Thinking, and Problem-solving skills are required to create AI solutions

**Critical thinking:** the ability of an individual to seek information, analyze alternatives and making conclusions or making decision. It includes the analytical thinking and uses it to generate a standpoint for someone's world view.

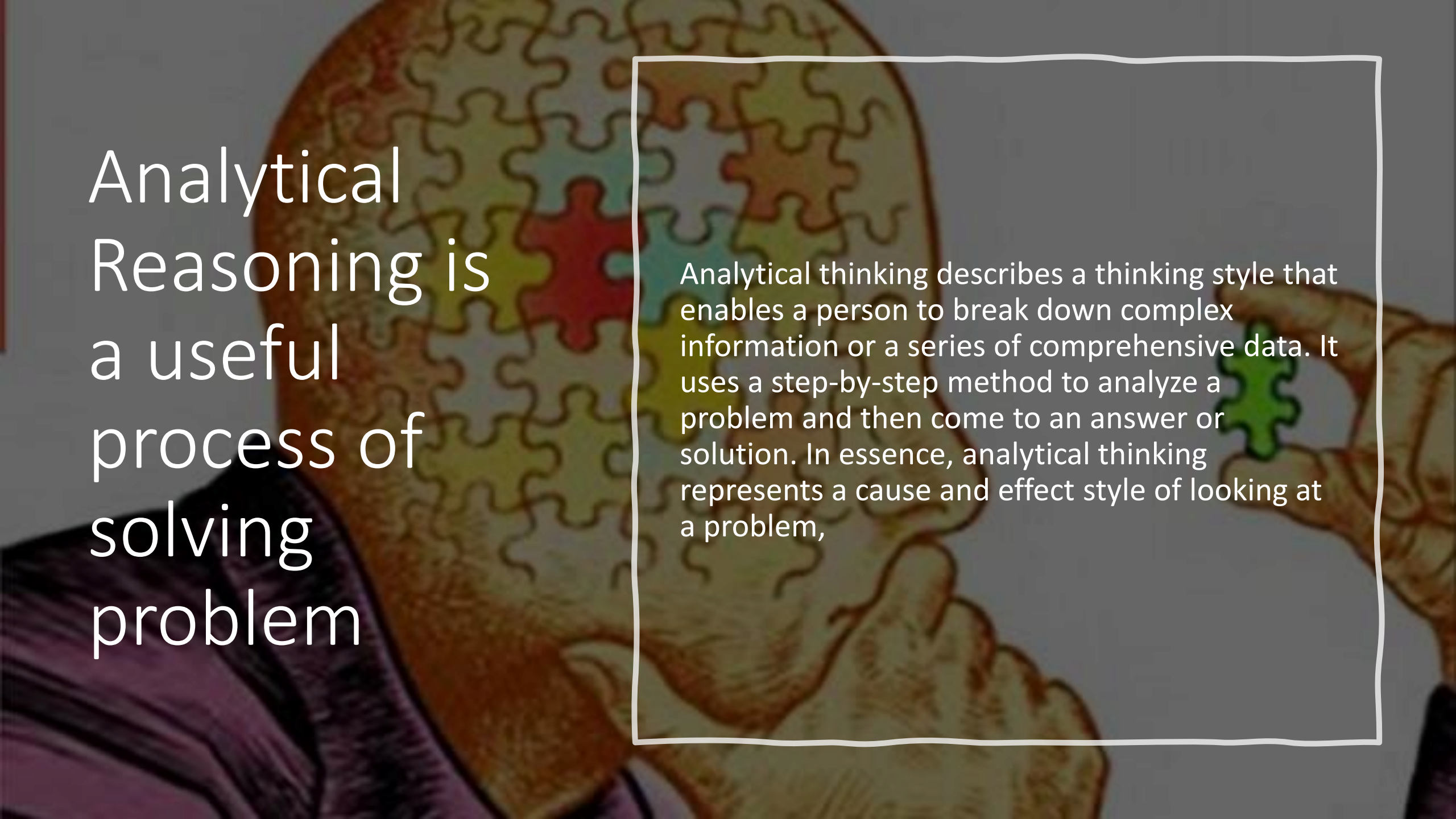
**Analytical thinking:** Analytical thinking describes a thinking style that enables a person to break down complex information or a series of comprehensive data. This process improves person's ability to identify patterns within a group of facts or rules and use those patterns to determine outcomes that could be or must be true or logically in identifying causes and effects.

The difference between the two skills is that the analytical thinking breaks down a complex information into small parts while critical thinking involves taking outside knowledge into account when evaluating information and making a conclusion about it.



# Analytical Skills



The background of the slide features a close-up of a hand placing a green puzzle piece into a larger assembly of multi-colored puzzle pieces. The puzzle pieces are in shades of yellow, orange, red, and blue. The hand is shown from the side, with fingers holding the green piece. The entire scene is set against a dark, textured background.

# Analytical Reasoning is a useful process of solving problem

Analytical thinking describes a thinking style that enables a person to break down complex information or a series of comprehensive data. It uses a step-by-step method to analyze a problem and then come to an answer or solution. In essence, analytical thinking represents a cause and effect style of looking at a problem,

# Analytical Reasoning Example 0

Example 0 – What could be the weight of a midsize Boeing 777?



x 1



x 3



x 8



x 10



x 8



x 3

$$3 \times 8 \times 10 \times 8 \times 3 \times 65 \text{ kg} = 374.4$$

# Analytical Reasoning Example

## Example 1 – Underlying Assumptions

Wife to Husband: Our joint income is lower than it could be. But soon I will begin to work an additional part-time job and I will earn extra income.

Proposed Assumption: **Asking for a raise at her current place of work is not the best way to increase the wife's income.**

A. True

B. False

Answer explanation:

- The conclusion of the wife's statement: Soon we will increase our joint income.
- The evidence supporting this conclusion: I will begin to work an additional part-time job.
- The underlying assumption/s that must be true for the conclusion to be true: A part-time job will provide me with extra money.
- The proposed assumption: "Asking for a raise at her current place of work is not the best way to increase the wife's income" is not necessary for the conclusion to be true.

**The correct answer is (B), False**

# Analytical Reasoning Example 2

Several years ago, Harold and his wife adopted a two-year-old orphan named Betty. Today, Betty is an undergraduate student, living far away from home. Harold feels unhappy and misses Betty tremendously. He would like her to come home more often. Proposed

**Assumption: Harold's wife doesn't feel unhappy.**

A. True

B. False

Answer explanation:

- Harold's wife is not mentioned in the passage, and,
- therefore, you cannot presume any information regarding her feelings.

**The correct answer is (B), False**



# Analytical Reasoning Example 3

## Example 3 – Inferences

Following a reduction in the number of applicants, the college has been asking students to evaluate faculty teaching performance for the last two years. The college's management announced that the purpose of these evaluations is to give information to faculty about teachers' strengths and weaknesses, and to allow those who make decisions about pay raises and promotions to reward the better teachers. Last week, Professor Burke, a recently retired senior lecturer at the college, wrote a letter in which he objected to these evaluations, claiming they compromise academic standards. Proposed Assumption: There is more to the management's announced intentions than those mentioned by them in the passage.

- A. True
- B. Probably true
- C. Insufficient data
- D. False
- E. Probably false

**The correct answer is (B)**

### Answer explanation:

- The text begins by introducing the management's announcement as a reaction to a negative trend—reduction in the number of student applications.
- While the announcement explicitly addresses both the college's staff and its students, it is likely that the issue at hand is not only a wish to achieve academic excellence
- but, in fact, a means to resolve the issue of reduced applications and college reputation, which has implications on the college's future.
- Therefore, the correct answer is probably true.

A word cloud centered around the word "THINKING". The word "THINKING" is the largest and most prominent, written in bold black capital letters. Surrounding it are various other words in different sizes, colors (orange, black, and grey), and orientations. The words include: "CRITICAL" (large orange), "FACTS" (medium grey), "PROBLEMS" (medium orange), "ANALYSIS" (medium black), "LOGIC" (medium orange), "INTELLECTUAL" (medium orange), "CAPACITY" (vertical black), "CLEAR" (medium orange), "INFORMATION" (small grey), "CRITIQUE" (medium orange), "DECISION" (medium black), "OBJECTIVE" (medium orange), "JUDGEMENT" (medium black), "ROCESS" (vertical black), and "ATIONAL" (vertical orange). The words are arranged in a way that they appear to be floating around the central word "THINKING".

CAPACITY

INTELLECTUAL

LOGIC ANALYSIS

CRITICAL

PROBLEMS

FACTS

CLEAR

THINKING

INFORMATION

CRITIQUE

DECISION

OBJECTIVE

JUDGEMENT

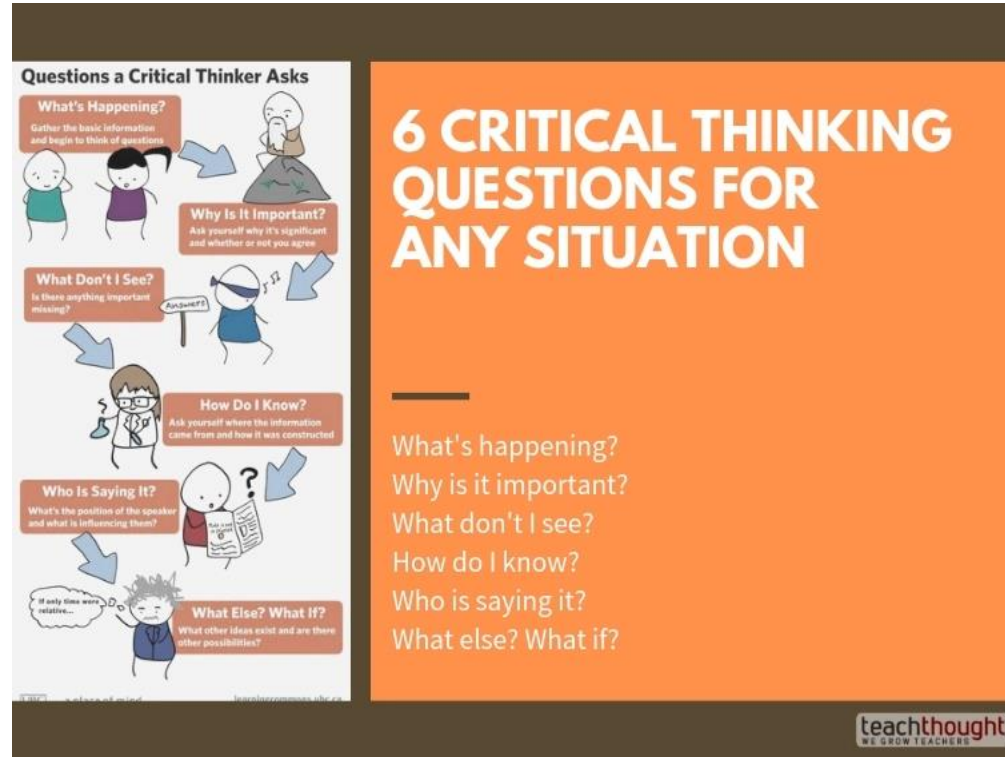
ROCESS

ATIONAL

# Process of Critical thinking

## CRITICAL THINKING SKILLS

- Problem-Solving
- Pin-Pointing
- Observation
- Research
- Analysis
- Identification
- Relevance
- Establishment
- Conclusion
- Communication



## Seek Information: How?


- Speak to a Domain Expert
- Literature Survey
  - Subject related books
  - Papers
  - googling

1<sup>st</sup> Step: understand or Identify the Problem

**IDENTIFY**

# Finding root cause of a problem using “why”

Five Whys - 2 Minute Tool Tip

 **JCG Management Consulting**

2-Minute Tool Tip:

**Five Whys**

Play (k)

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# Finding root cause of a problem using Fishbone

Fishbone - 2 Minute Tool Tip

 **JCG Management Consulting**

2-Minute Tool Tip:

**Fishbone  
Diagram**

Play (k)

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# Problem



## Critical Thinking

1. Gathering relevant information
2. Evaluating information

Analytical Thinking

- I. Examining chunks of data or information i.e. See plots scatters, lines, histograms etc.
- II. Identifying key issues
- III. Use logic and reasoning to process information
- IV. Separating more complex information into simple parts
- V. Sub-dividing information into more manageable sizes

Analytical Thinking

3. Asking questions: why, what, who, where
  1. Ask domain experts, literature survey, wiki, google etc
  2. Understand connections and relationships
  3. Identify Cause and Effect
  4. Drawing conclusions
  5. Assess bias
4. Weighing Opinions
5. Reach well organized conclusions
6. Consider alternate possibilities
7. Testing conclusions
8. Verifying if evidence support the conclusion

Root Cause

SOLUTION

/// **ACTION** ///

A graphic on the left side of the slide featuring a black circle and several overlapping red geometric shapes, including triangles and polygons. The text "Make it a habit." is written in white, bold, sans-serif font across the center of the graphic.

**Make it a  
habit.**

Solving Problem  
performing Critical  
thinking and  
Analytical thinking

