Logical Thinking: the gateway to Transformative Education

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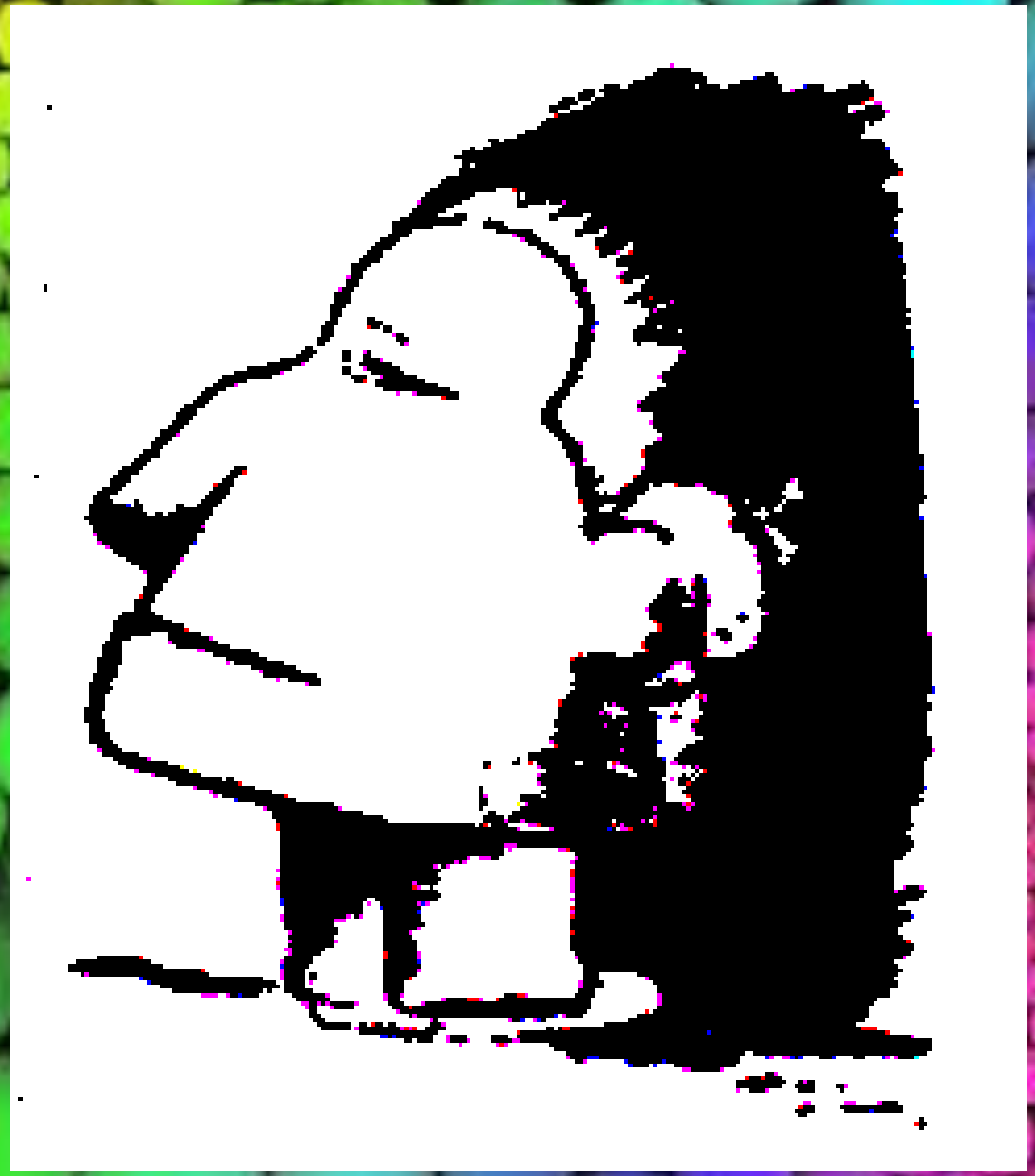
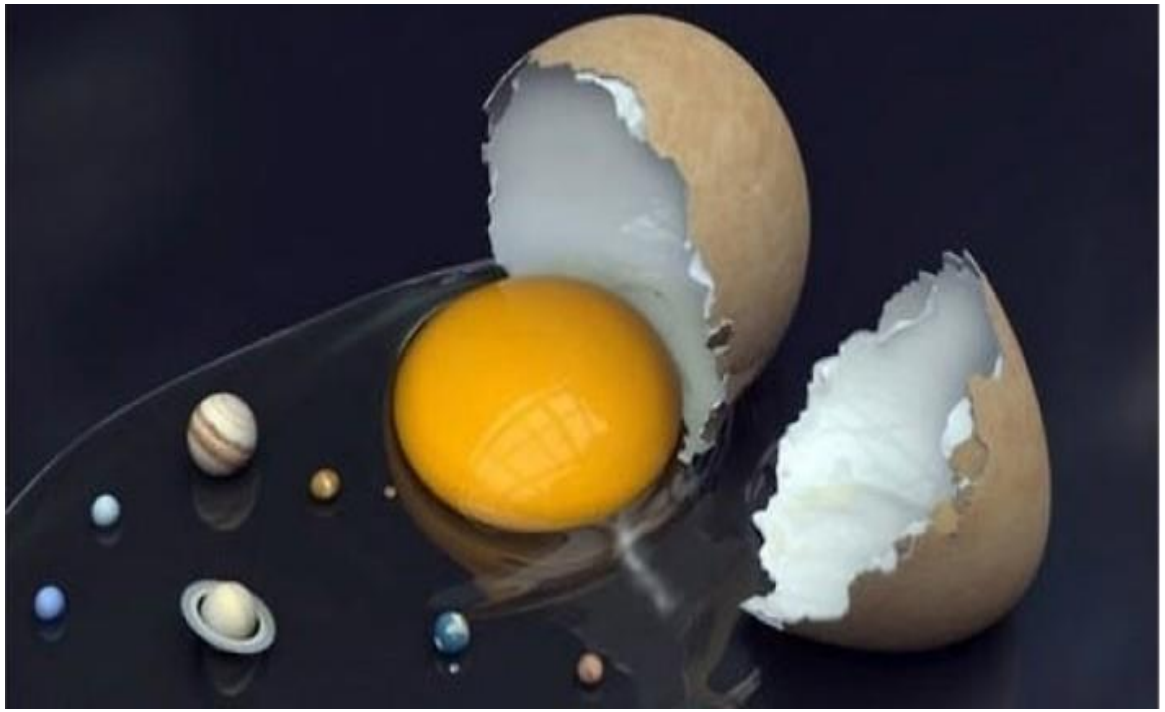
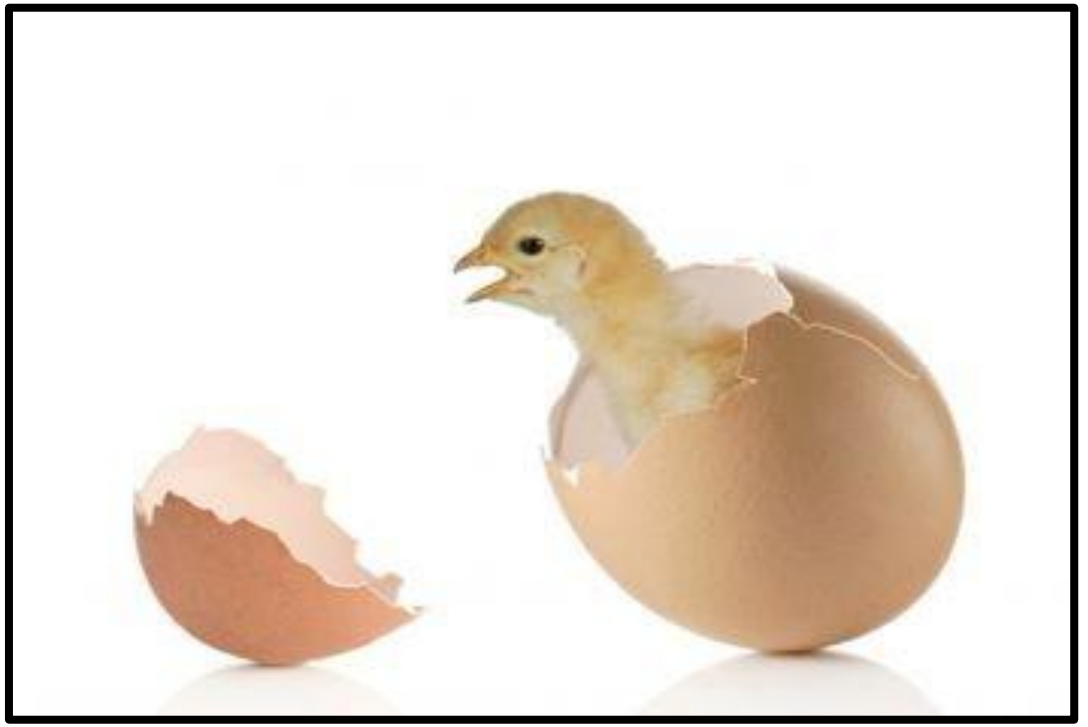



Personal Facts
Name: Matthew Hirsch
Edu: BBA in Marketing
Serving Size: 1 Creative
Amount/serving %DV* Amount/serving %DV*
Motivation 101% Illustrator 87%
Communication 97% InDesign 73%
Adaptability 97% Photoshop 66%
Work Ethic 111% HTML&CSS 83%
Creativity 93% Spanish 55%
GVSU - 2009 to 2013 | Polishing Center - 2014
Ingredients: Marketing, web design, web development, content management, graphic design, brand strategy, typography, PPC advertising, search engine optimization, search engine marketing, social media marketing/management.
1 248 752 1940 0
Comments or Questions?
matthew@hirschcreative.com
or call the barcode.
THANK YOU BRUCE!

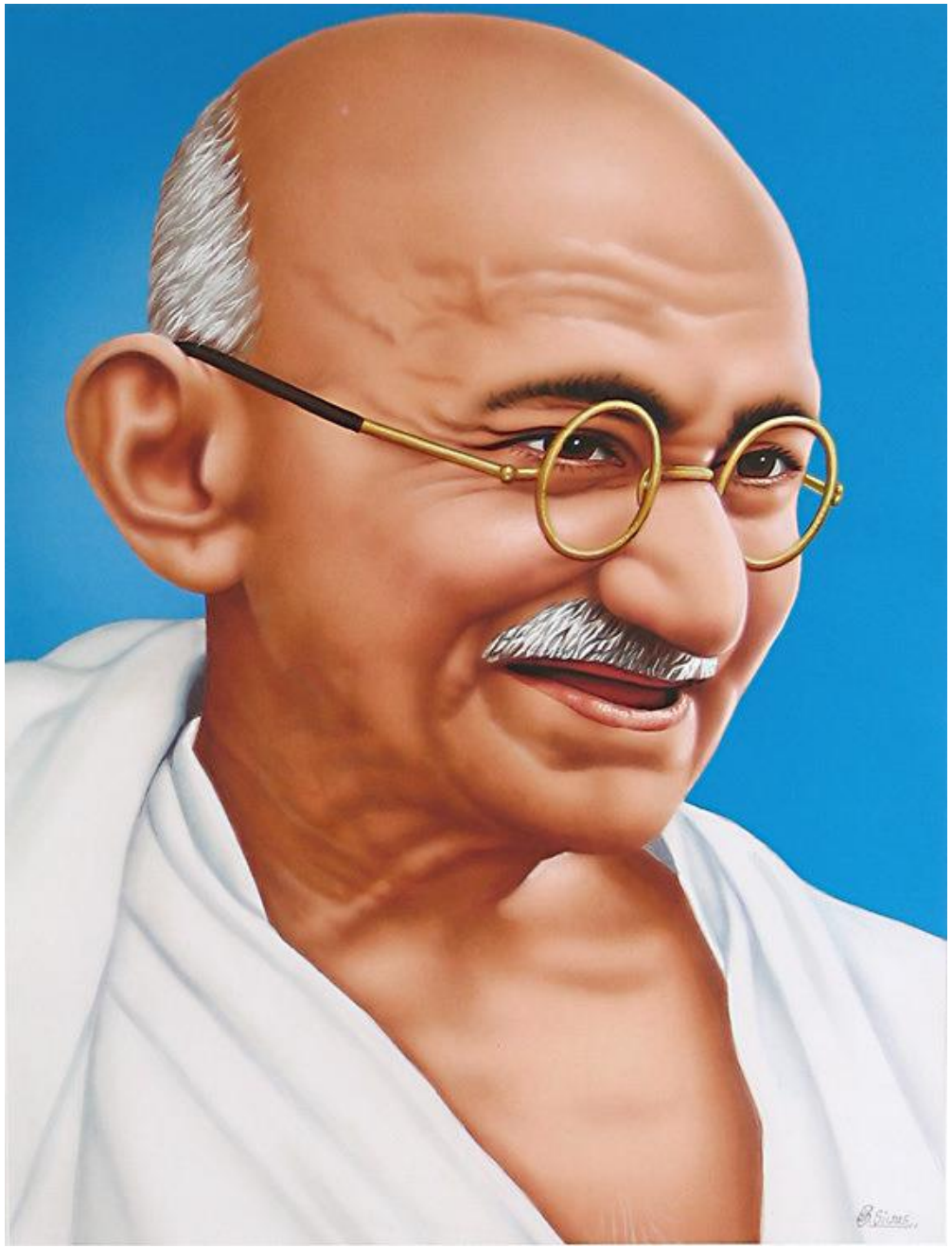





Kirsty Grant
PHOTOGRAPHY


Change From the Inside Out

What do they have in common?



What is thinking?

Thinking is an activity of mind.

Thinking is the process between sensory input and one's own opinion.

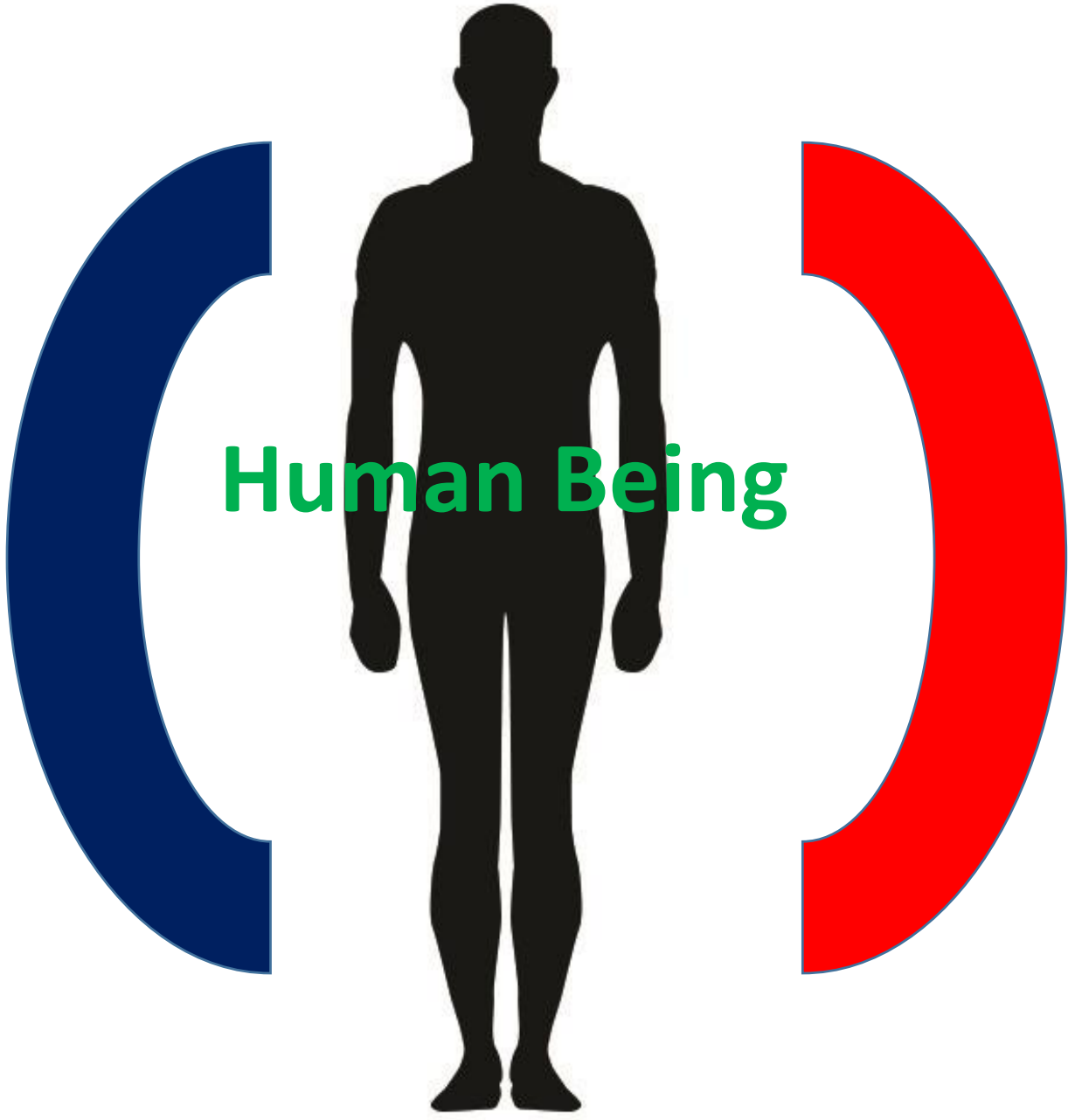
What is thinking?

Thought or thinking is a mental process which allows beings to model the world, and so to deal with it effectively according to their goals, plans, ends and desires.

(*en.wikipedia.org/wiki/Thinking*)

Thinking is the way that the mind makes sense of the world.

Mind Being
(Think + Intellect)



Body Being
(Physical senses)

The Three Functions of the Mind

Thinking: Makes sense of the world

- Judging
- Perceiving
- Analyzing
- Clarifying
- Determining
- Comparing
- synthesizing

Feeling: Tells us how we are doing

- Happy
- Sad
- Depressed
- Anxious
- Stressed
- Calm
- Worried
- excited

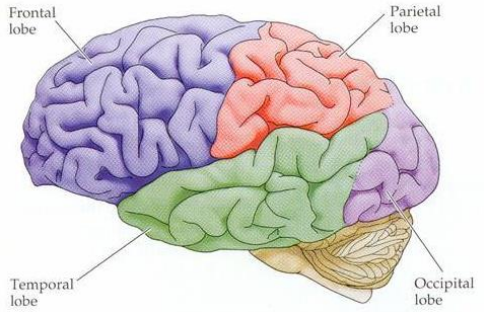
Wanting: Drives us to act as we do

- Goals
- Desires
- Purposes
- agendas
- Values
- motives

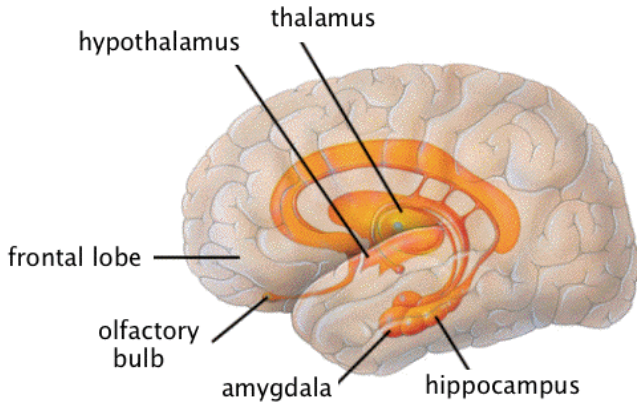
What is the "key player" of thinking?

Parts of Brain Involved in Learning

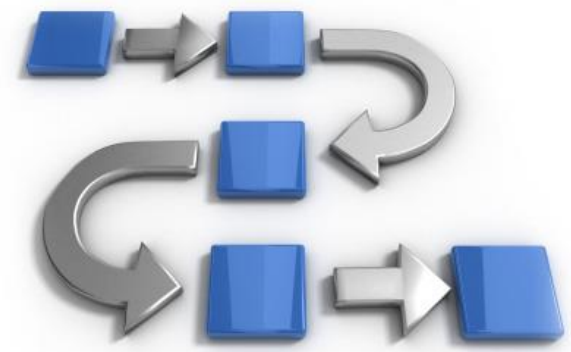
- Thinking Brain
  - Frontal Lobe
    - language, reasoning, movement
  - Occipital Lobe
    - vision
  - Temporal Lobe
    - hearing
  - Parietal Lobe
    - taste, temperature, touch



- Emotional Brain
  - Thalamus
  - Amygdala
  - Hippocampus



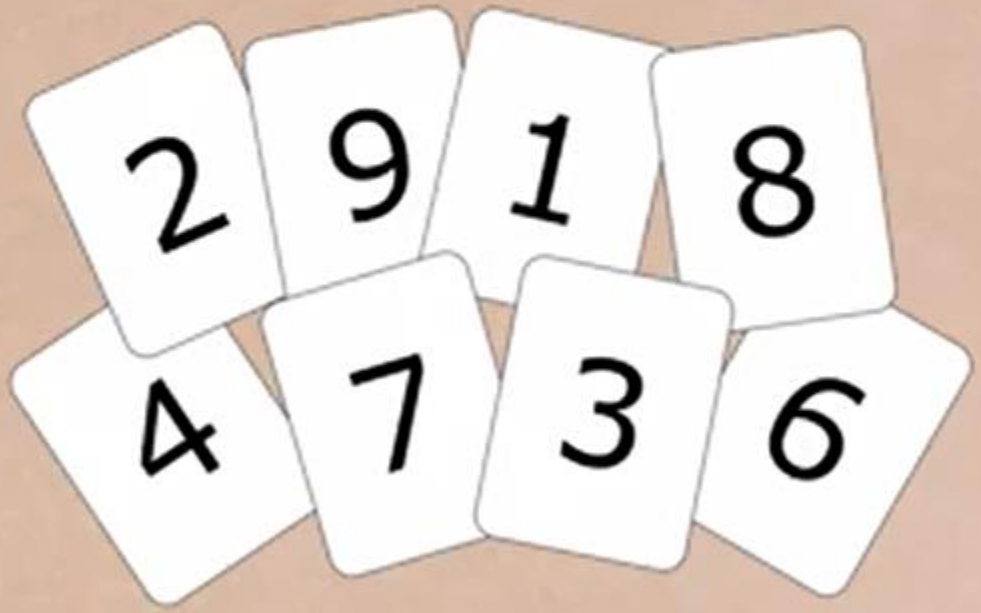
Thinking



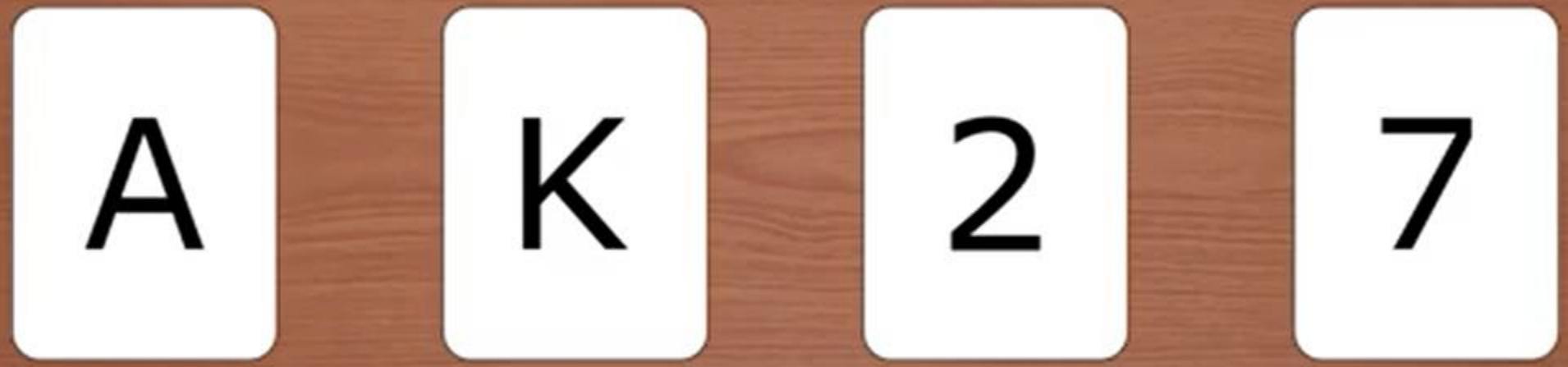
OR

PROCESS OR PRODUCT

Wason's 4-card Selection Task



If a card has a vowel on one side, it must have an even number on the other side



จะต้องหยิบ card ใบไหนออกบ้างที่ทำให้ Rule ที่ให้ Valid

(Johnson-Laird & Wason, 1970a)
RESULTS:

46% A 2 ✗

33% A ✗

7% A 2 7 ✗

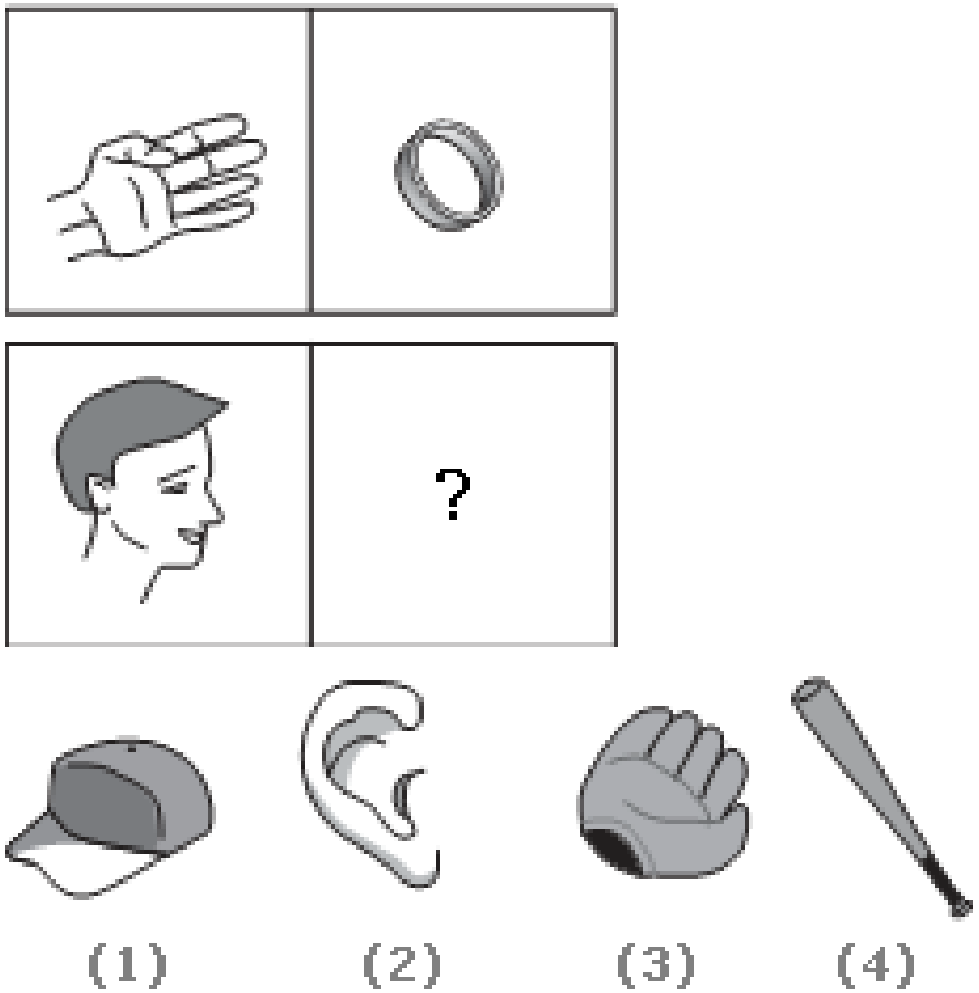
4% A 7 ✓

*10% - *other*

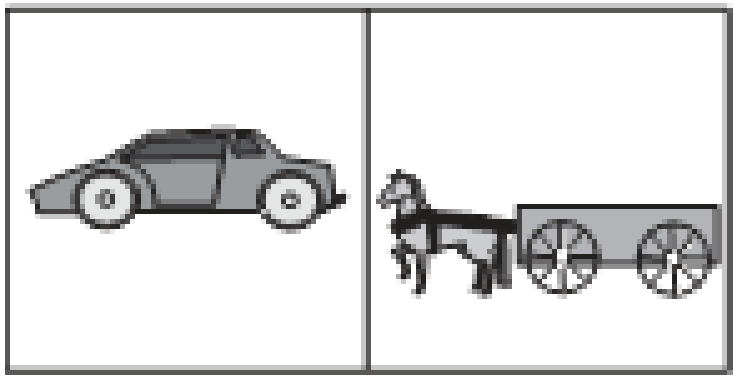
Step 1	**Let**	**a**	**=**	**b**	**(1)**
	Then	**a+a**	**=**	**a+b**	**(2)**
		2a	**=**	**a + b**	**(3)**
		2a-2b	**=**	**a + b -2b**	**(4)**
		2(a-b)	**=**	**a-b**	**(5)**
		2(a-b)/(a-b)	**=**	**(a-b)/(a-b)**	**(6)**
		2(1)	**=**	**1**	**(7)**
		2	**=**	**1**	

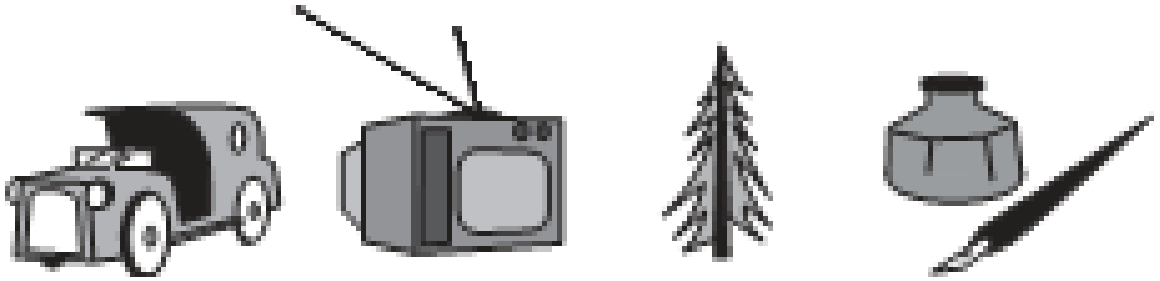
Choose the picture that would go in the empty box so that the two bottom pictures are related in the same way as the top two are related.

Q1



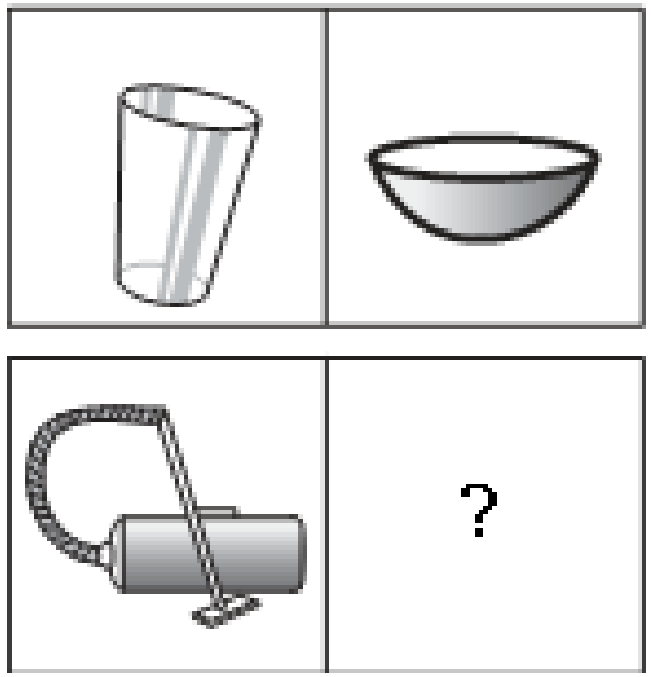
Q2

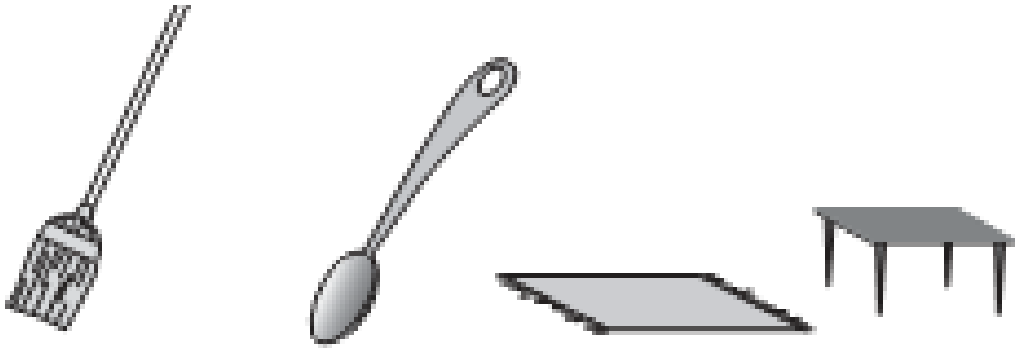




(1) (2) (3) (4)

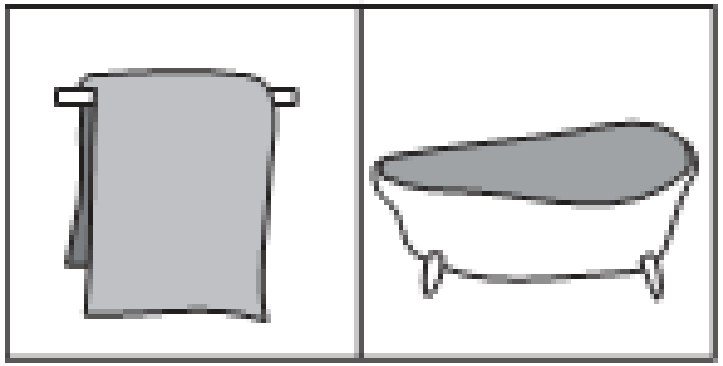
Q3

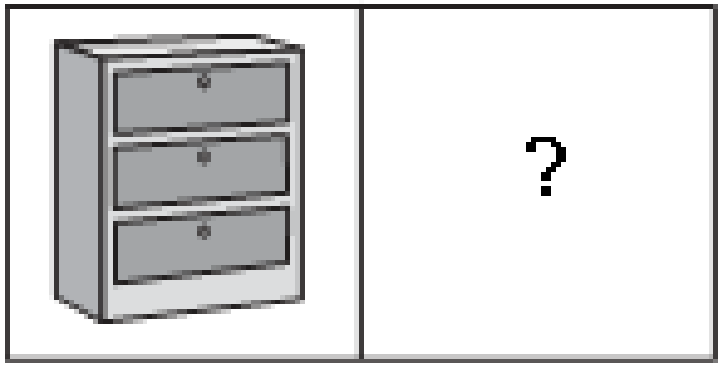




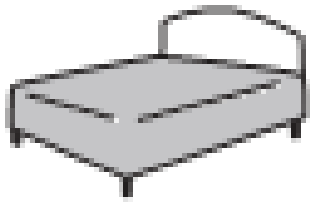
(1) (2) (3) (4)

Q4

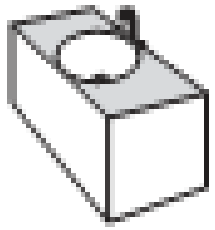




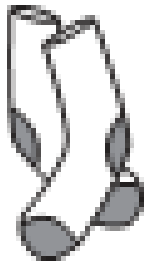
(1)



(2)

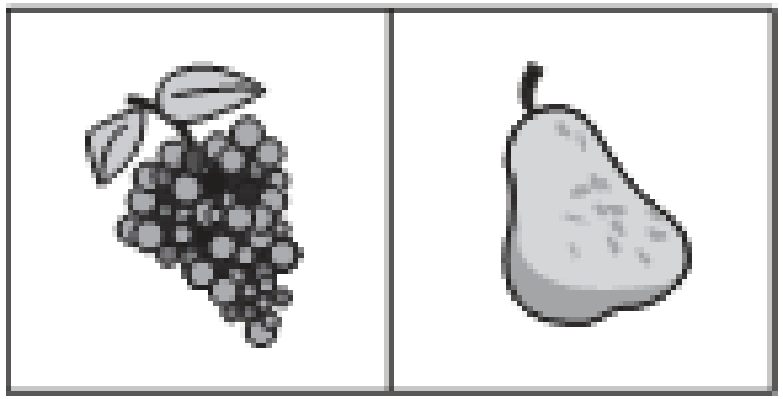


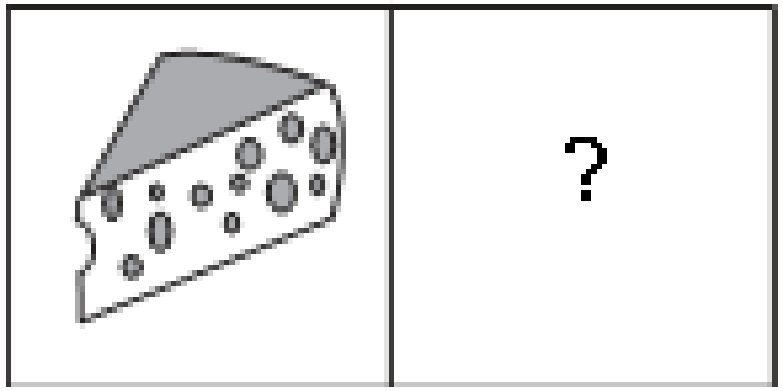
(3)

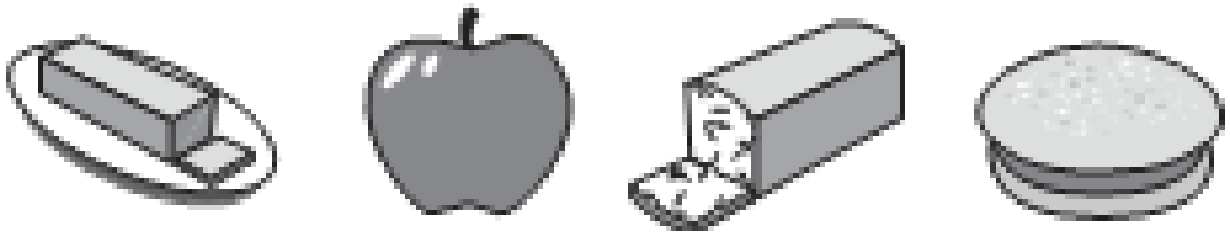


(4)

Q5



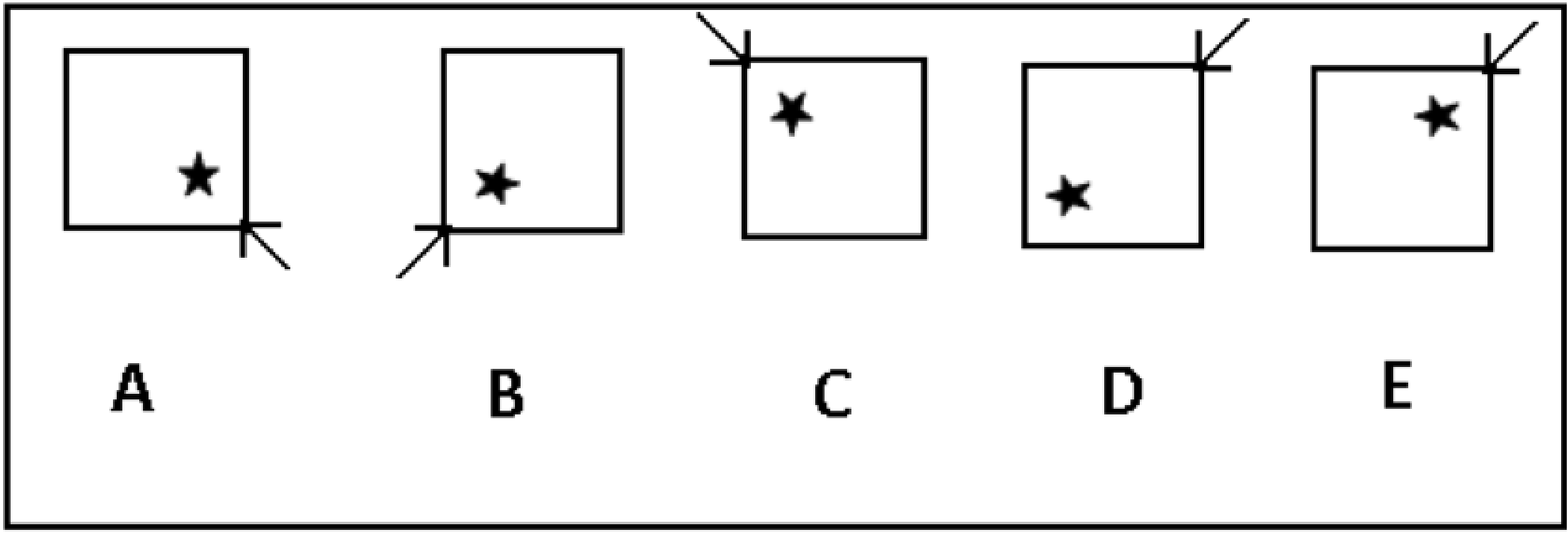




(1) (2) (3) (4)

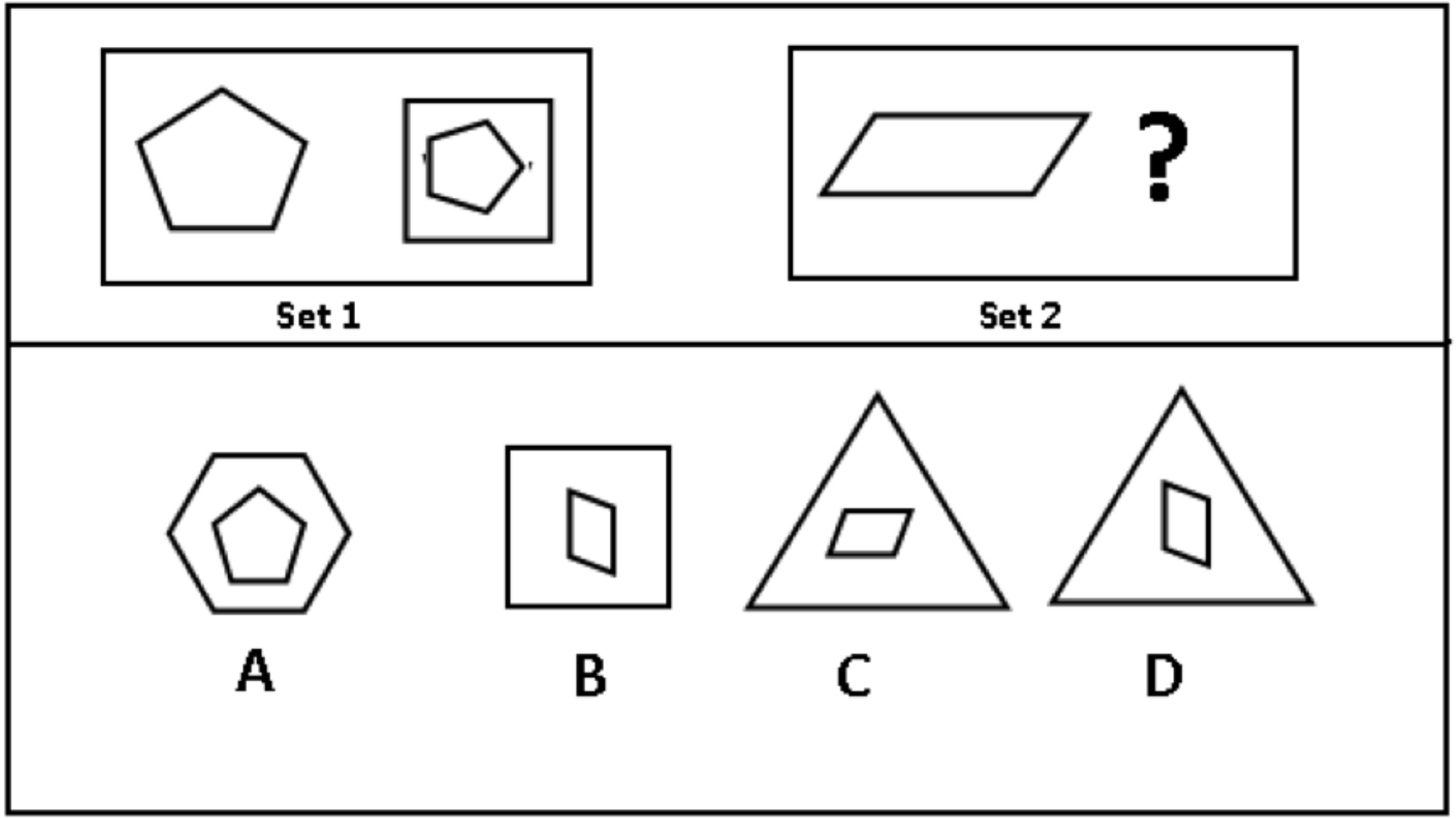
Out of the five figures below, four are similar in some manner. Select the odd figure.

Q6



Look at the relationship between the two figures of set 1. Establish a similar relationship within set 2 choosing one of the following options.

Q7



Q8

If 7+3=9

5+7=11

Then 6+5= ?

Which of the following number will replace the (?) mark and complete the series –

7, 17, 12, 22, 17, 27, 22, ?

Q9

Answer Option:

a. 20

b. 32

c. 40

d. 52

Which of the following number will replace the (?) mark and complete the series –
1, 2, 6, 12, 20, 30, ?

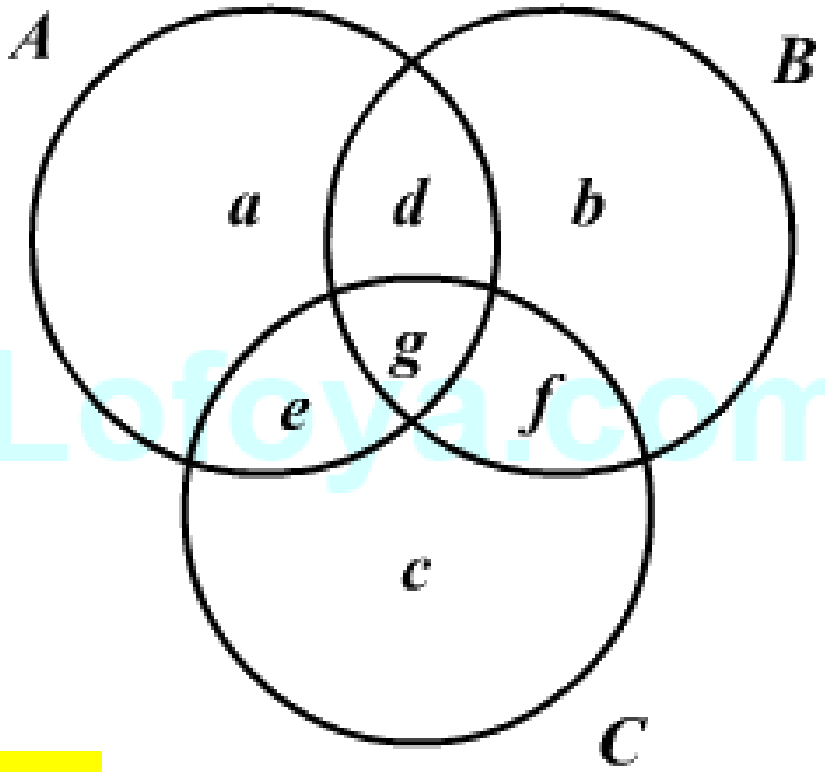
Q10

Answer Option:

a. 36
b. 42
c. 55
d. 60

The above figure is a representation of a Venn diagram. Here each of the circles

A, *B* and *C* represents a set of elements.
Set *A* has the elements *a*, *d*, *e* and *g*.
Set *B* has the elements *b*, *d*, *g* and *f*.
Set *C* has the elements *e*, *g*, *f* and *c*.



Both *A* and *B* have the elements *d* and *g*.
Both *B* and *C* have the elements *g* and *f*.
Both *C* and *A* have the elements *e* and *g*.
A, *B* and *C* all have the element *g*.

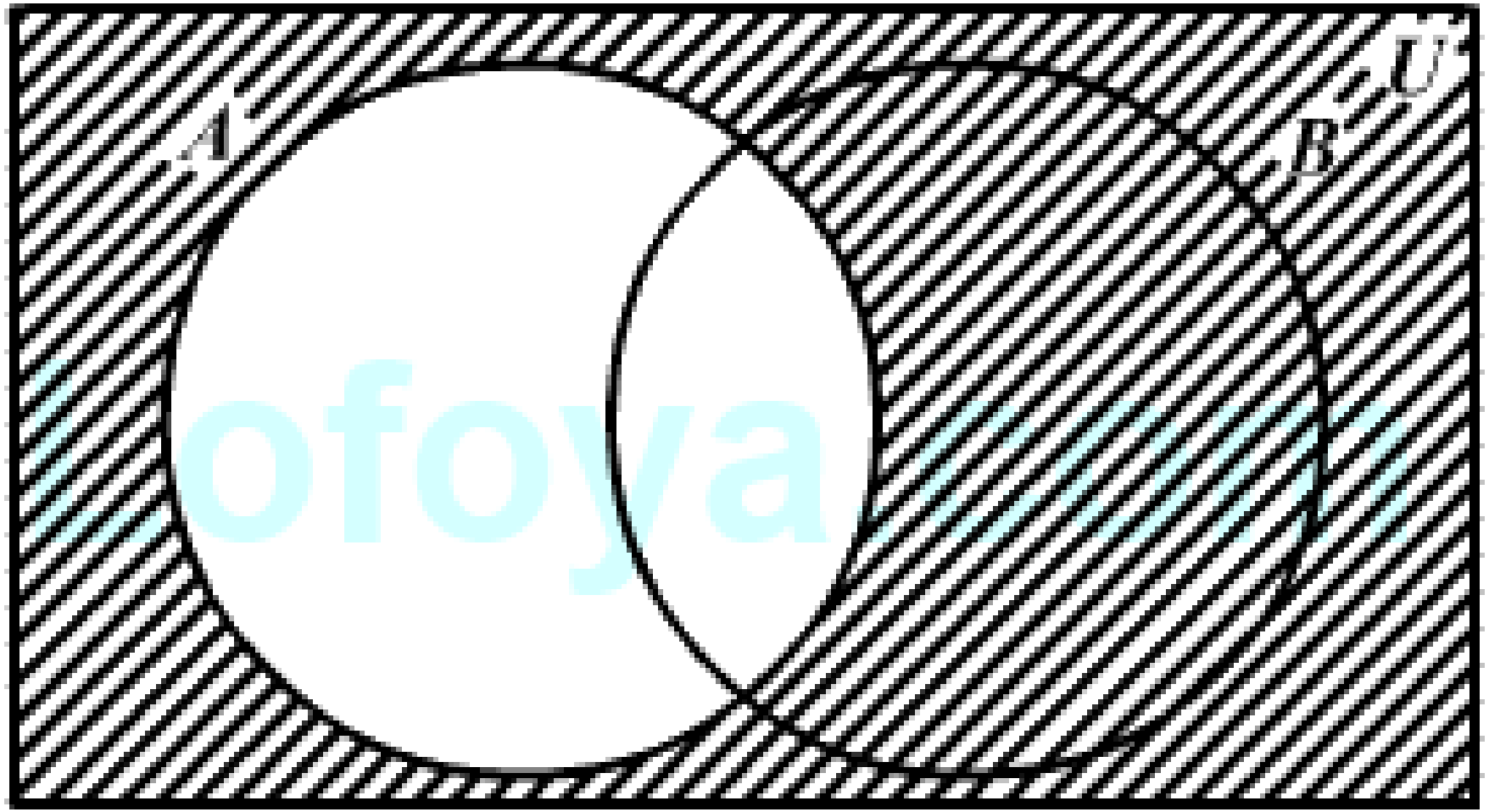
Consider a class of students that form the universal set. Set *A* is the set of all students who were present in the English lecture, while Set *B* is the set of all the students who were present in the History lecture.

It is obvious that there were students who were present in both lectures as well as those who were not present in either of the two lectures.

Complement of a set *A* in the given context is the set having all elements that belong to the Universal set but not to *A*.

In our example, the complement of set *A* will be all the students who were absent in the English lecture.

Suppose,
$U = \{a, b, c, d, e, f, g, h\}$ and $A = \{a, b, c, d, e\}$,
Then A', or complement of the set $A = \{f, g, h\}$

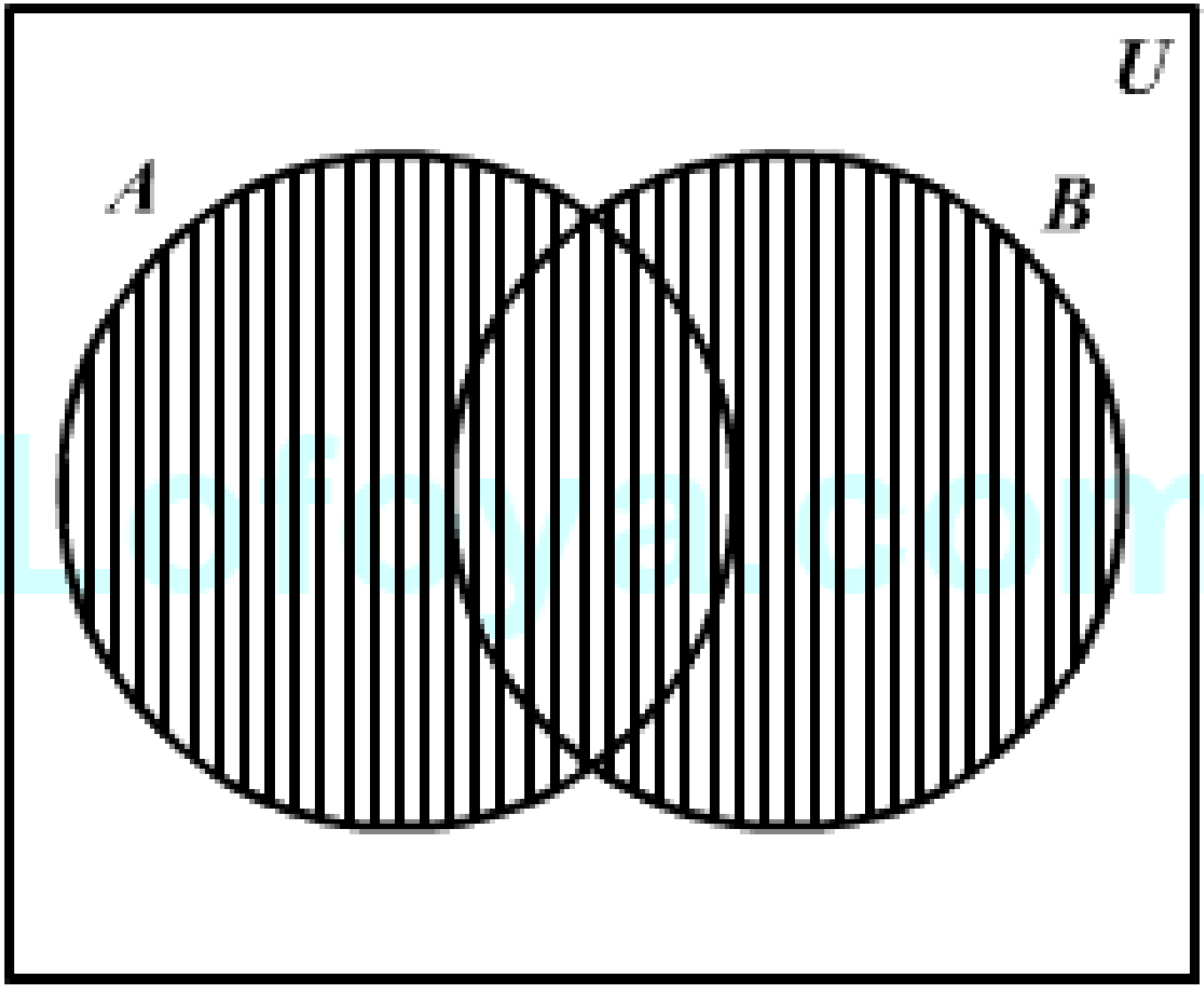


A'

Union of Sets:

The union of two sets *A* and *B* is defined as the set having all the elements which belong to either *A* or *B* or both *A* and *B*.

In our example, the union of sets *A* and *B* will contain all the students who were present in at least one of the two lectures. Only students who did not attend a single lecture will not be considered in the union.

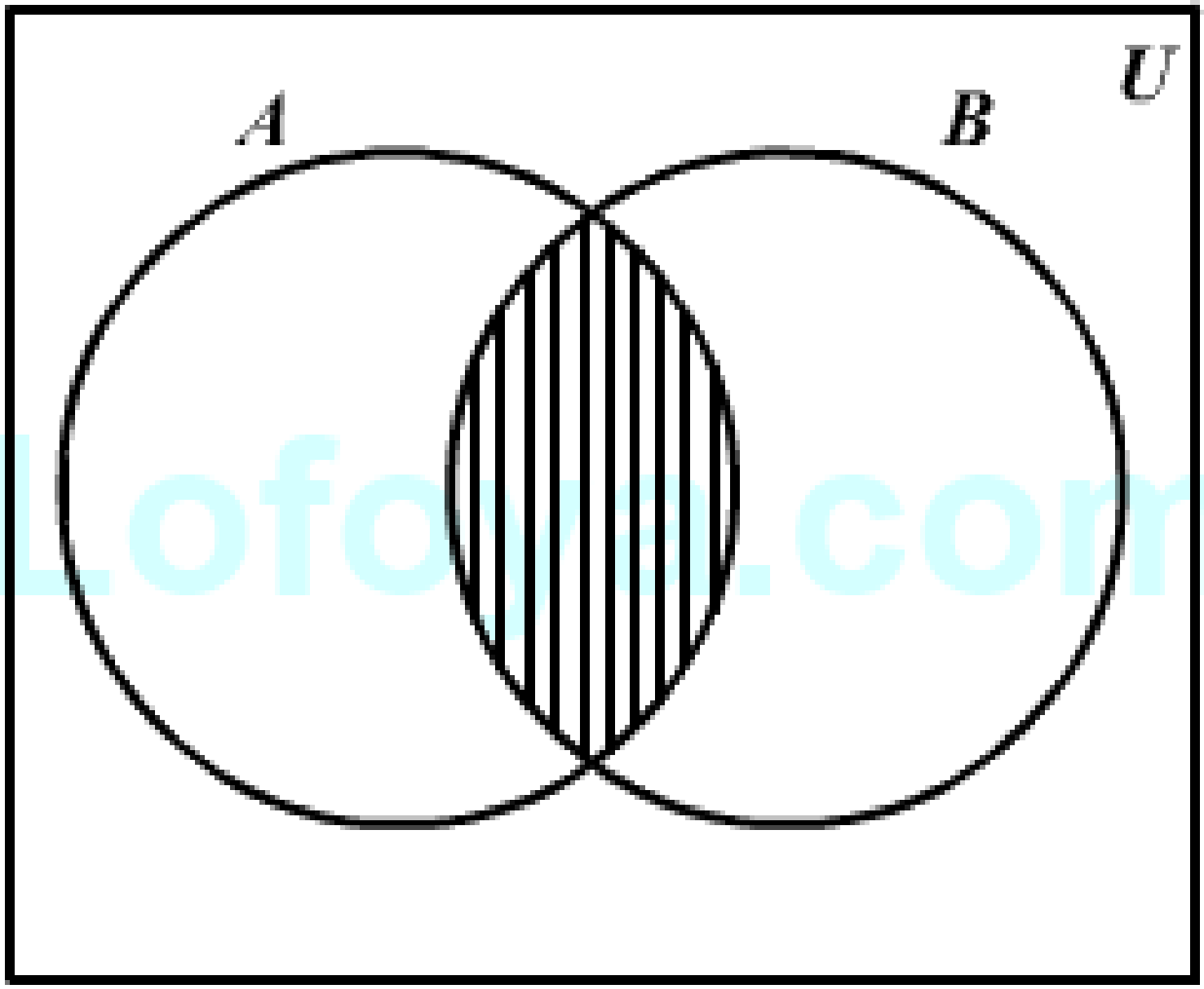


$A \cup B$

Intersection of Sets:

The intersection of sets *A* and *B* is defined as the set having all elements which belong to both *A* and *B*.

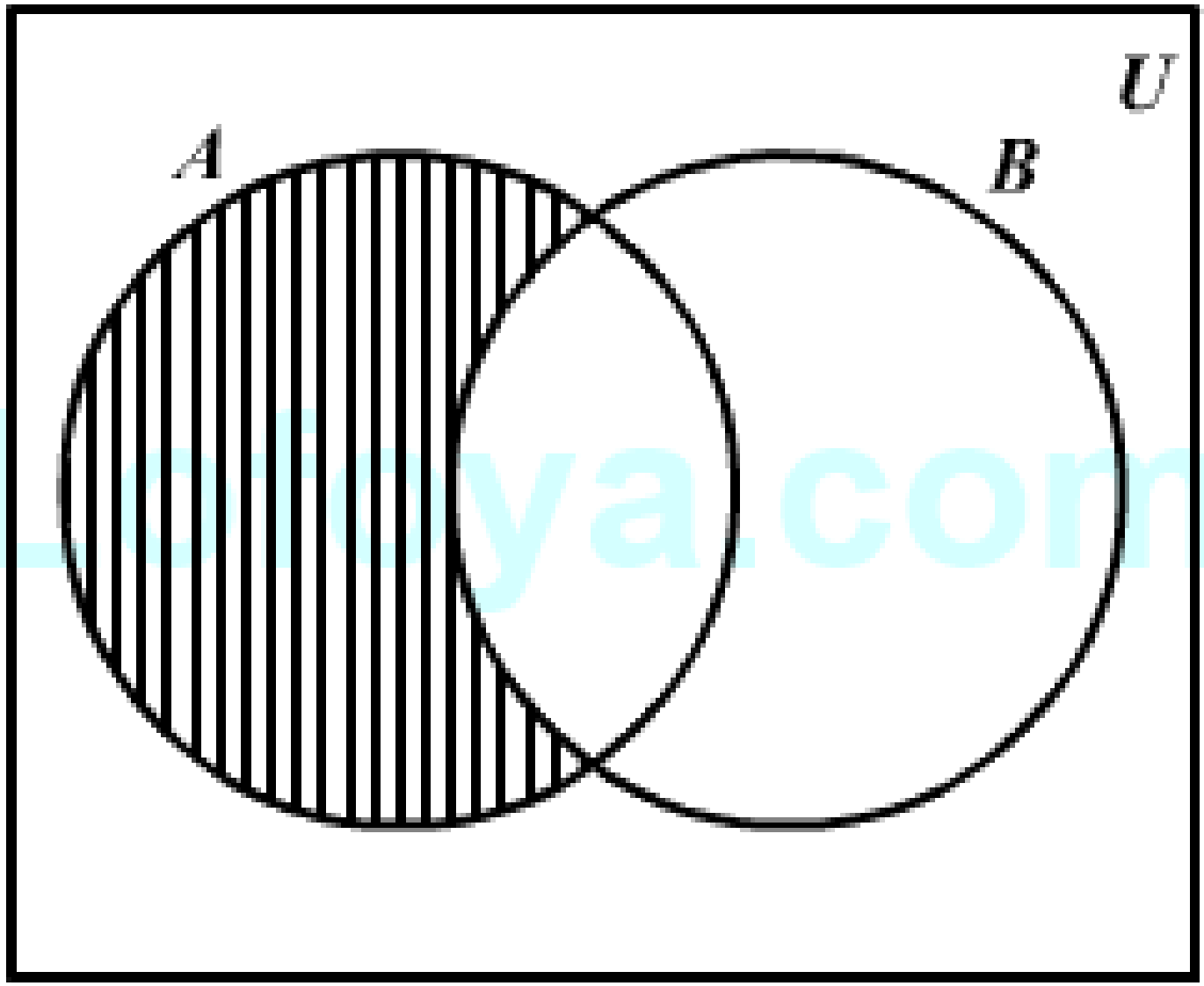
In our example, the intersection of *A* and *B* will contain all the students who sat for both, English as well as History lectures.



$A \cap B$

Difference of Sets:
The difference of two sets *A* and *B*, *A* - *B*, is defined as the set having all the elements of A that do not belong to *B*. Please note that *A* - *B* is not always equal to *B* - *A*.

Example 1: In our example, *A* - *B* will be all the students who have attended only the English lecture and not the history lecture while *B* - *A* will be all the students who have attended just the History lecture and not the English lecture.



$A - B$

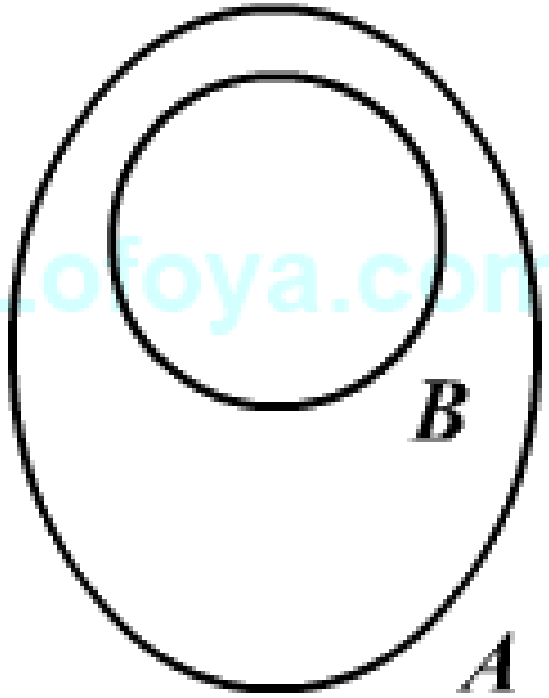
Example

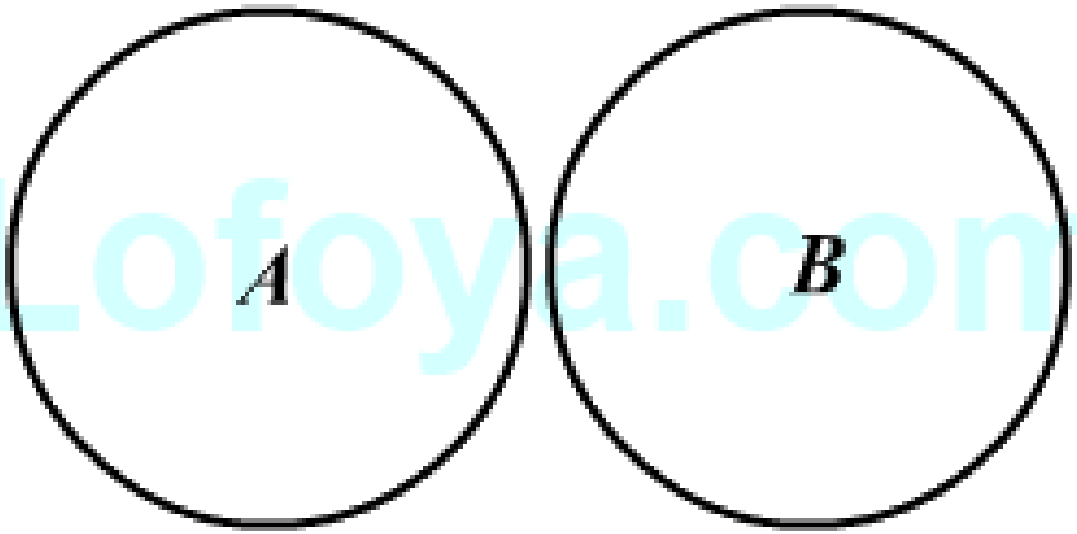
Express the following as Venn diagrams:

(1) Every bull is an animal

(2) No animal is a bull

Let *A* = Set of Animals, *B* = Set of bulls





Every bull is an animal

No animal is a bull

Logic – Basic Terms

Logic: the study of how to reason well.

Validity: Valid thinking is thinking in conformity with the rules. If the premises are true and the reasoning is valid, then the conclusion will be necessarily true.

Premise

- an idea or theory on which a statement or action is based (Cambridge dictionary)
- a proposition supporting or helping to support a conclusion. (www.dictionary. Com)
- Logic A previous statement or proposition from which another is inferred or follows as a conclusion: (www.oxforddictionaries.com)

What is logic?

- Logic is not an empirical science
- Formal or informal science
- Logic vs.Psychology:
  1. The Laws of Thinking
  2. The Science of Reasoning
  3. The Science of Argument
- The study of the methods and principles used to distinguish good (correct) from bad (incorrect) reasoning or argument.
- The way to the good reasoning (making good argument) and critical thinking

What Is an Argument?

- An argument is the fundamental structure of the reasoning.
- An argument consists of premises and conclusion.
- An argument is used to provide reasons for supporting some claim or proposal.
- Logic aims to the study of the various forms of argument.
- The ultimate goal of logic is to evaluate arguments.

Two Kinds of Argument

- The traditional distinction between deduction and induction:

Deduction

Some general principles

↓

A particular case

Induction

Some particular cases

↓

A general principle

Deductively valid?

Premise: All cars have wheels
Premise: All wheels are round

Conclusion: All cars have round wheels

Deductively valid?

Premise: I have a diamond
Premise: Most diamonds are shiny

Conclusion: My diamond is shiny

Deductively valid?

Premise: I have a diamond
Premise: Most diamonds are shiny

Conclusion: My diamond is shiny

Real world inductive inferences

- **Medical diagnosis:**
  - **Symptoms, test outcomes (observable) → Diseases (unobservable)**
- **Scientific reasoning:**
  - **Experimental data (observable) → Hypotheses (unobservable)**
- **Law:**
  - **facts (observable) → guilt (unobservable, uncertain)**

Deductive Reasoning

Examples:

1. *All students eat pizza.*

   Claire is a student at ASU.

   Therefore, Claire eats pizza.

2. *All athletes work out in the gym.*

   Barry Bonds is an athlete.

   Therefore, Barry Bonds works out in the gym.

Deductive Reasoning

3. All math teachers are over 7 feet tall.

<u>Mr. D. is a math teacher.</u>

Therefore, Mr. D is over 7 feet tall.

- The argument is valid, but is certainly not true.
- The above examples are of the form

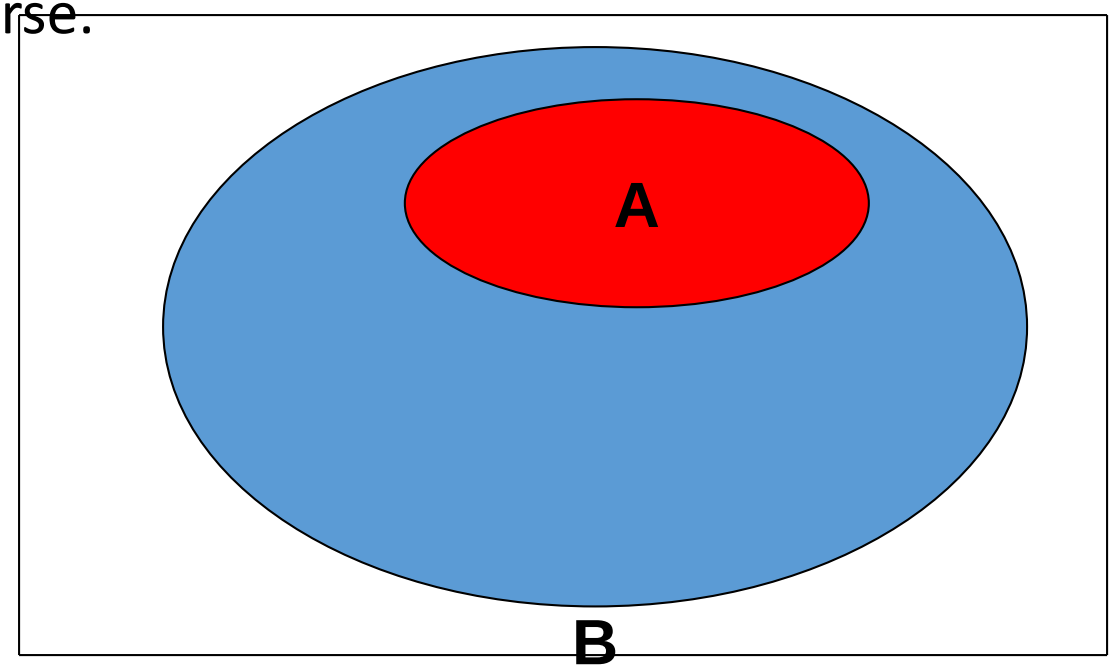
If *p*, then *q*. (major premise)

<u>*x* is *p*.</u> (minor premise)

Therefore, *x* is *q*. (conclusion)

Venn Diagrams

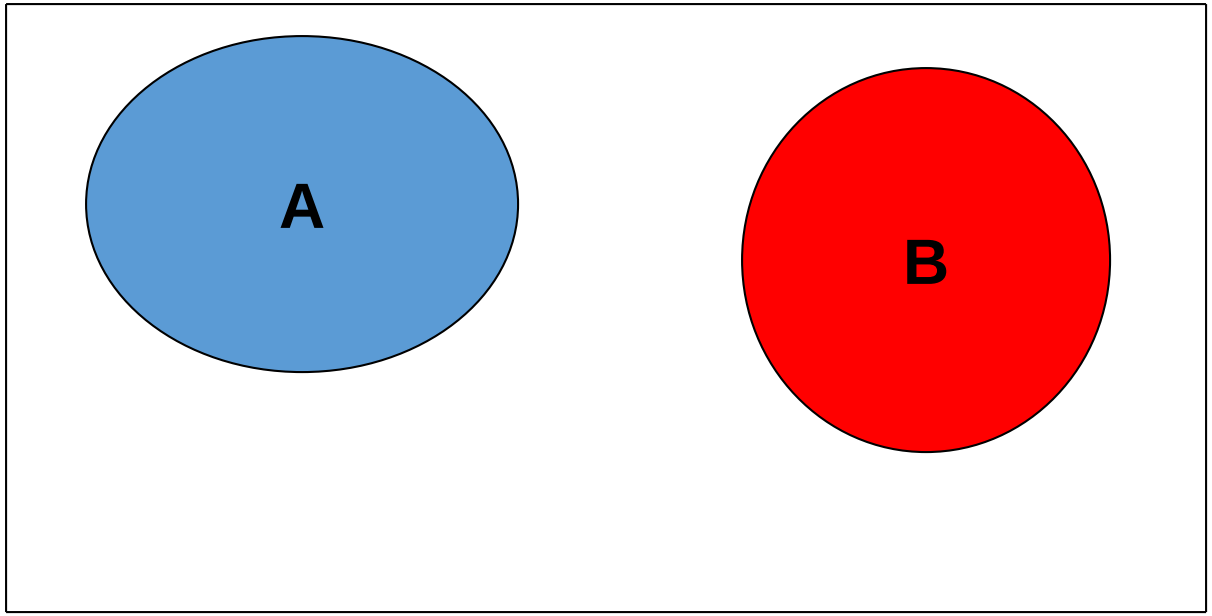
- **<u>Venn Diagram</u>**: A diagram consisting of various overlapping figures contained in a rectangle called the universe.



This is an example of **all A are B**. (If A, then B.)

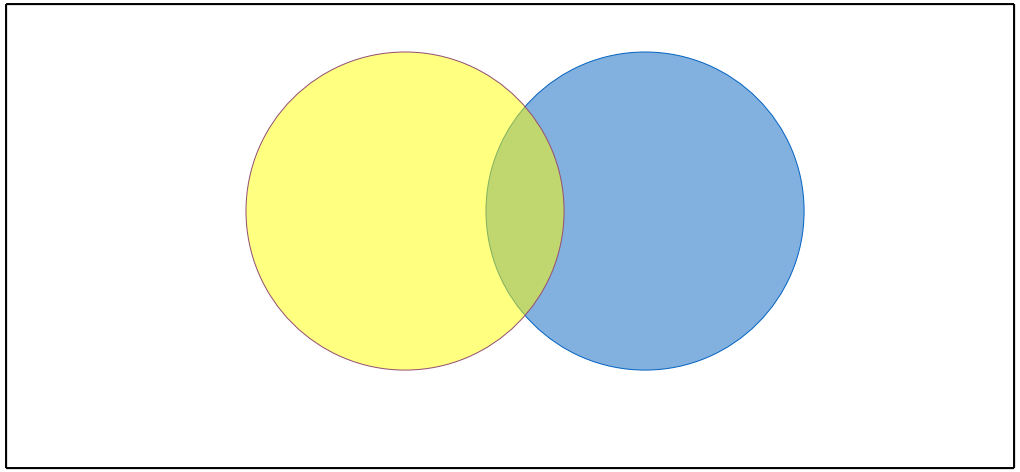
Venn Diagrams

This is an example of No A are B.



Venn Diagrams

This is an example of some A are B. (At least one A is B.)



The yellow oval is A, the blue oval is B.

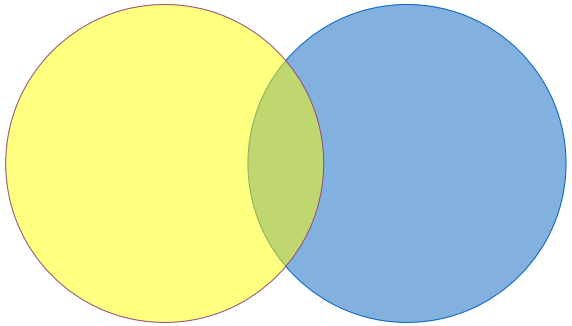
Some professors wear glasses.

<u>Mr. Einstein wears glasses.</u>

Therefore, Mr. Einstein is a professor.

Let the yellow oval be professors, and the blue oval be glass wearers. Then x (Mr. Einstein) is in the blue oval, but not in the overlapping region.

The argument is invalid.



Inductive Reasoning

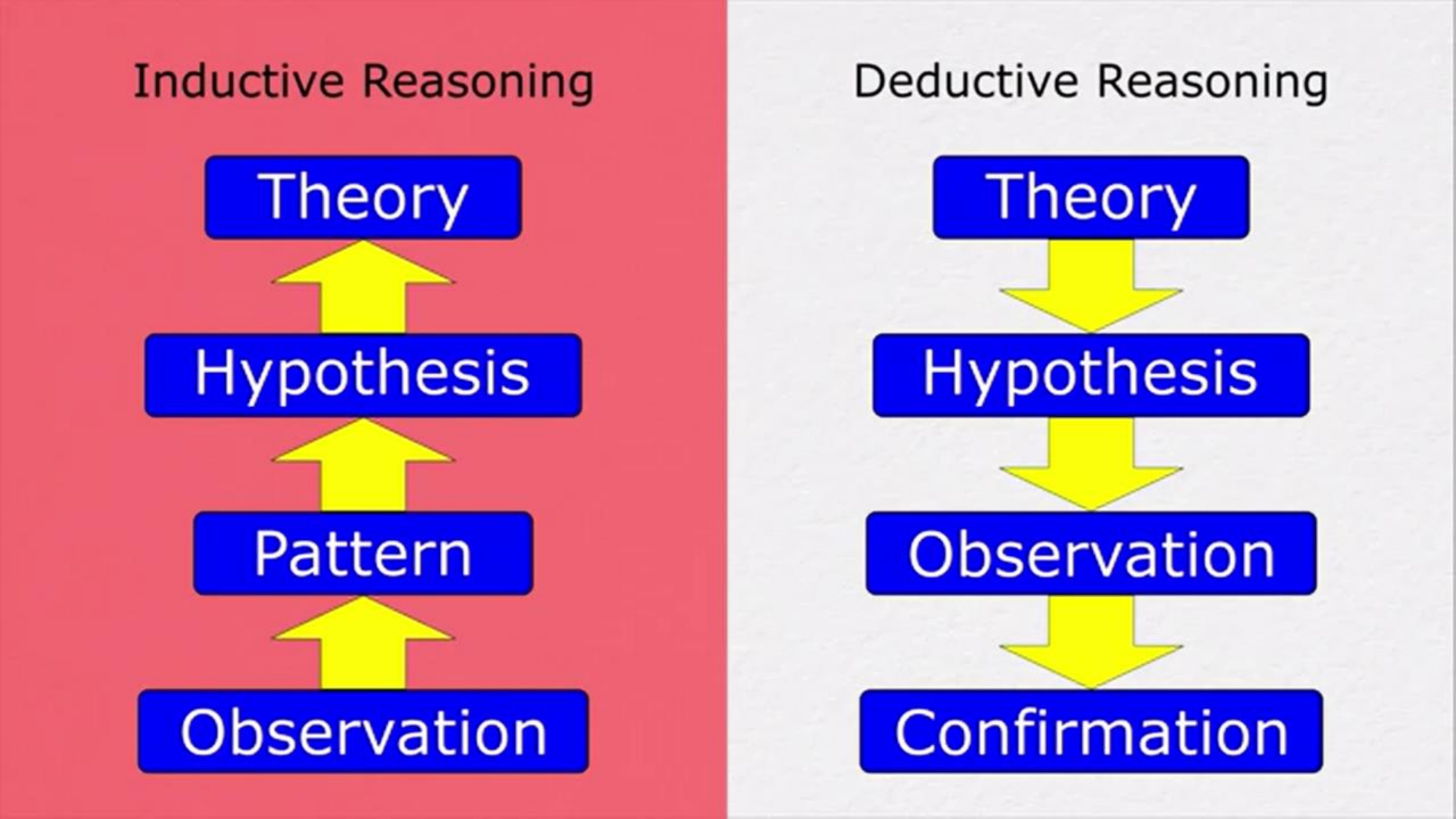
Inductive Reasoning, involves going from a series of specific cases to a general statement. The conclusion in an inductive argument is never guaranteed.

Example: What is the next number in the sequence 6, 13, 20, 27,…

There is more than one correct answer.

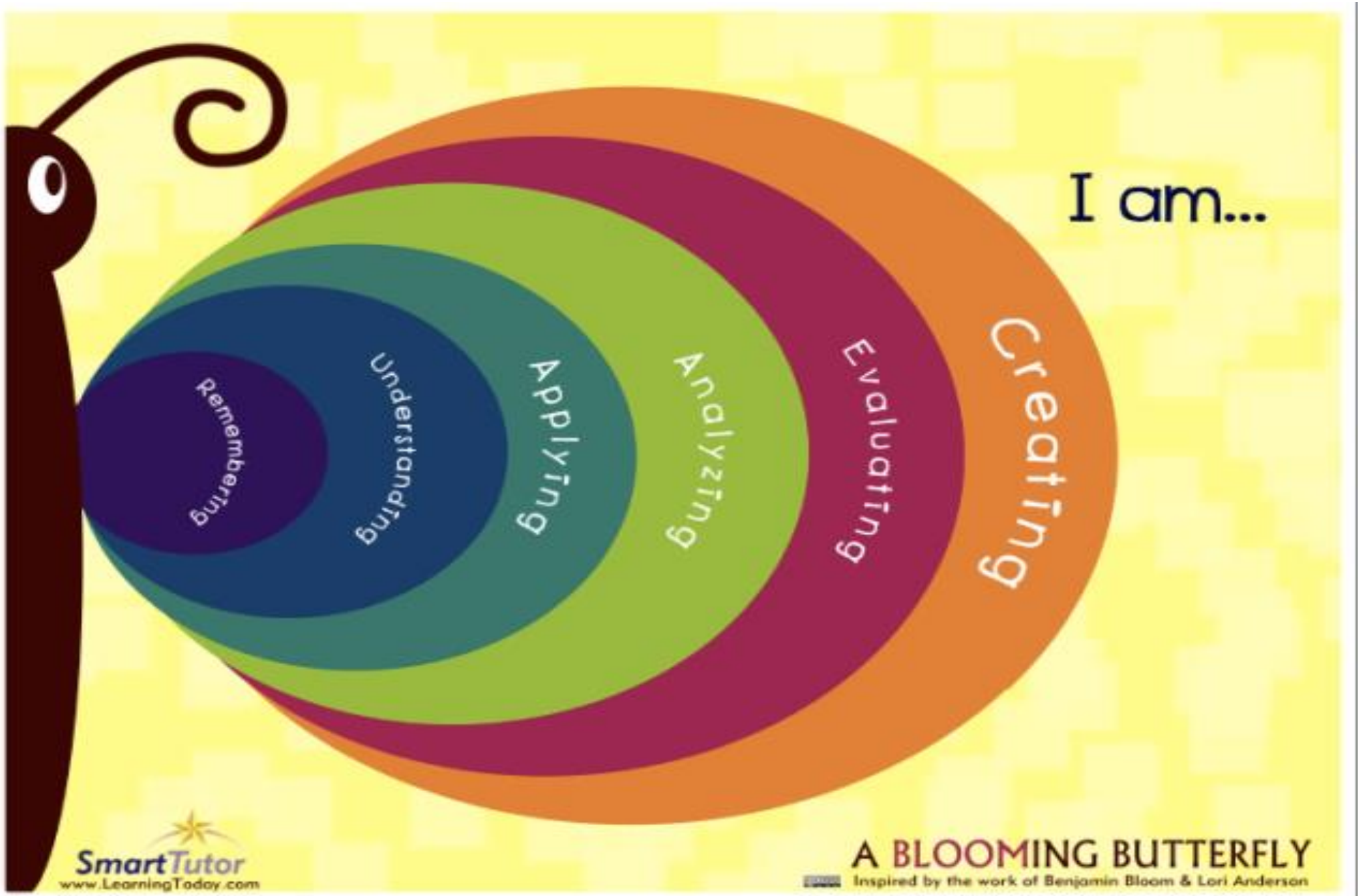
Inductive Reasoning

- Here's the sequence again 6, 13, 20, 27,…
- Look at the difference of each term.
- 13 – 6 = 7, 20 – 13 = 7, 27 – 20 = 7
- Thus the next term is 34, because 34 – 27 = 7.
- However what if the sequence represents the dates. Then the next number could be 3 (31 days in a month).
- The next number could be 4 (30 day month)
- Or it could be 5 (29 day month – Feb. Leap year)
- Or even 6 (28 day month – Feb.)


Inductive Reasoning
Theory
Hypothesis
Pattern
Observation
Deductive Reasoning
Theory
Hypothesis
Observation
Confirmation

Concluding Remarks: The Uses of Logic

- Evaluate someone else's argument by exposing its structure
- Set up your own argument
- Solve problems and puzzles by answering the why-questions (giving the reasons)
- Inference to the best through using the present evidences
- Thinking effectively and making decision wisely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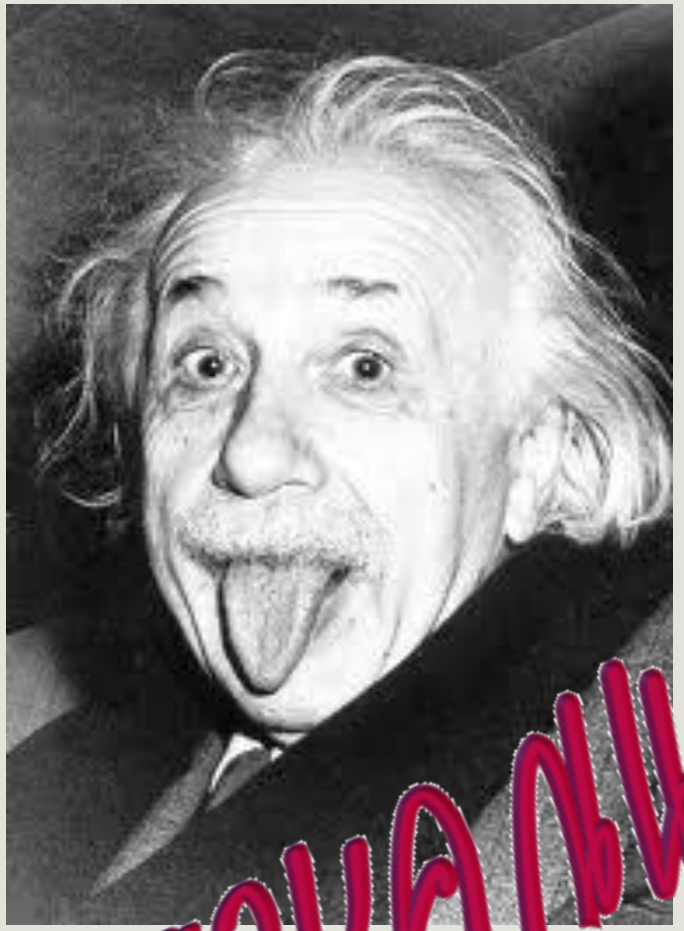
"INSANITY IS DOING THE SAME THING OVER AND OVER AND EXPECTING A DIFFERENT RESULT."

--ALBERT EINSTEIN



ขอบคุณครับ