NAGOYA UNIVERSITY LIBRARY WORKSHOPS 2015

学術論文の基本的な目的は、結論へと至る論理的ステップを提示することによって、
論文の主張する結論を受け入れるよう読者を説得することである。

How to use logic practically

WRITING
教養教育院

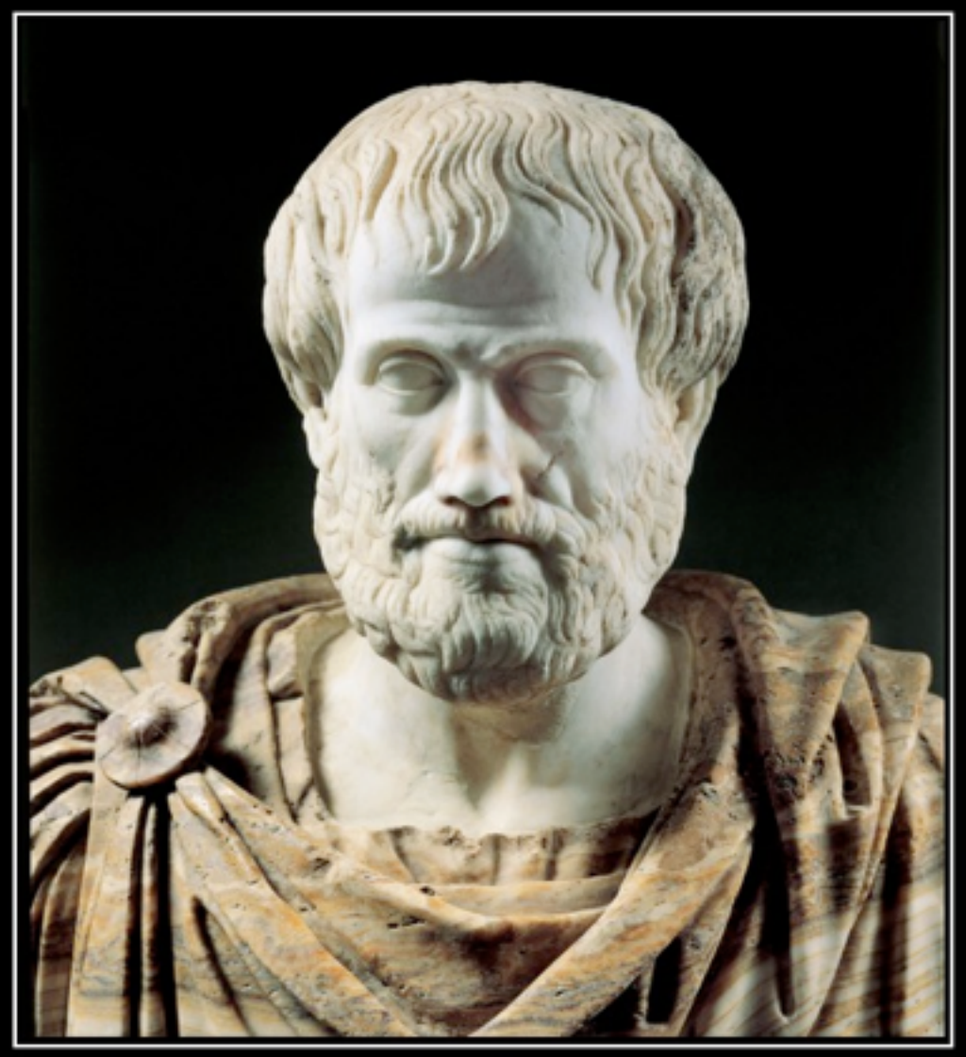
June 3, 2015

Instructor: Dr. Paul Lai

学術論文の基本的な目的は、結論へと至る論理的ステップを提示することによって、
論文の主張する結論を受け入れるよう読者を説得することである。

What is logic?

WRITING
教養教育院



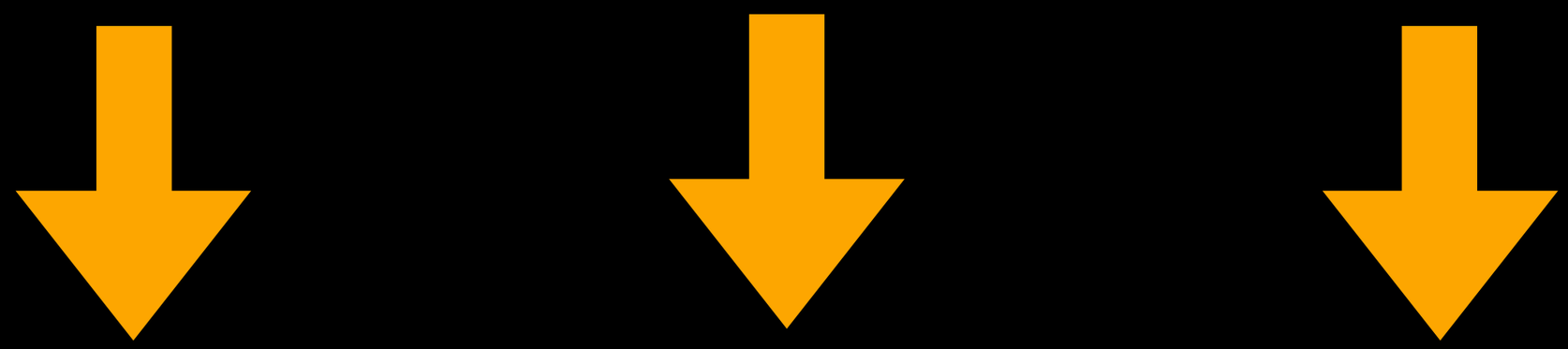
384-322 BC

Logic is the "organon", or instrument of thought, which is specifically used for acquiring knowledge.

According to Aristotle, we would not come to know anything without logic.

KNOWLEDGE ACQUISITION

When you see many people inside a subway station wearing a wet raincoat or carrying a wet umbrella, what can you tell?



It must be raining outside.

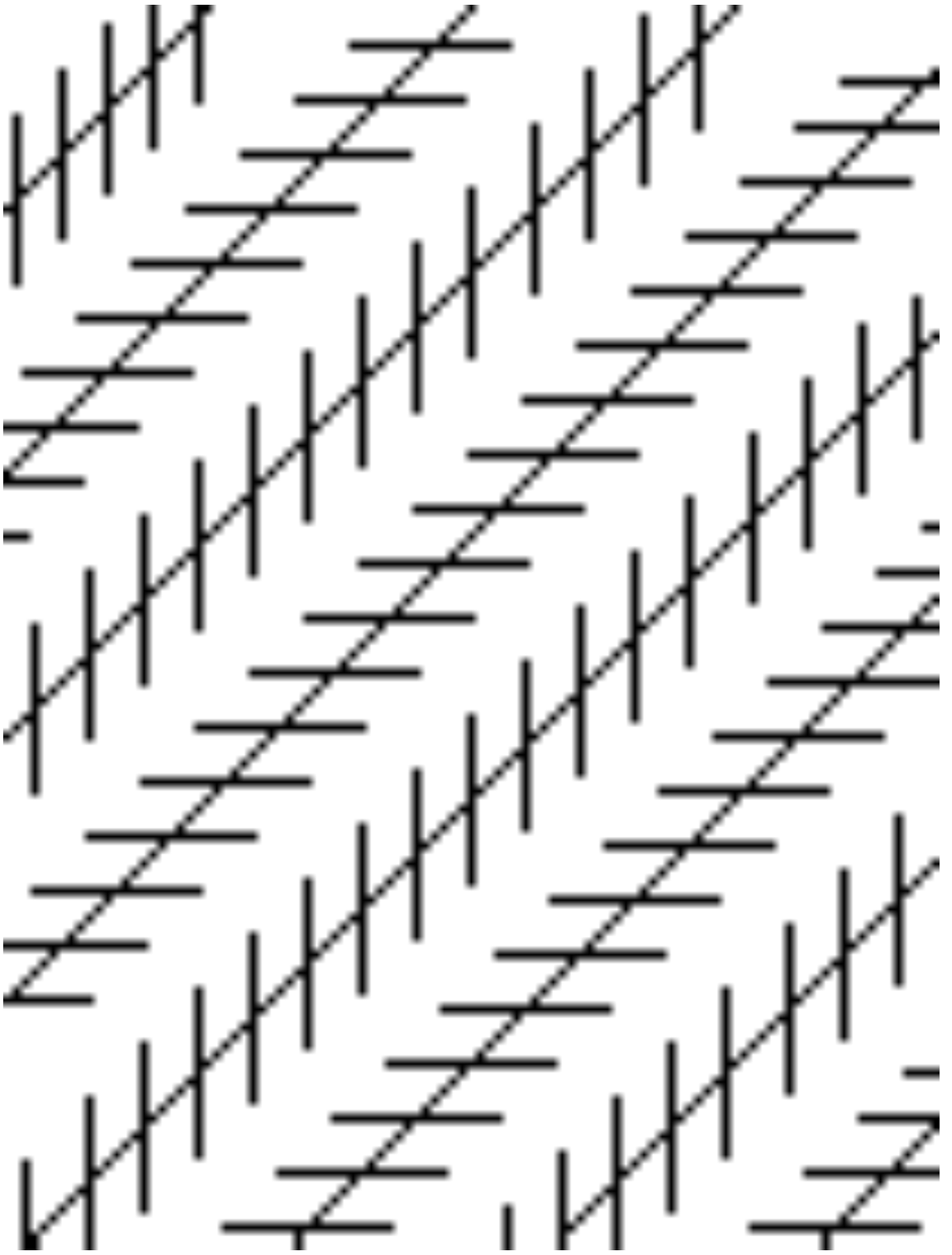
KNOWLEDGE ACQUISITION

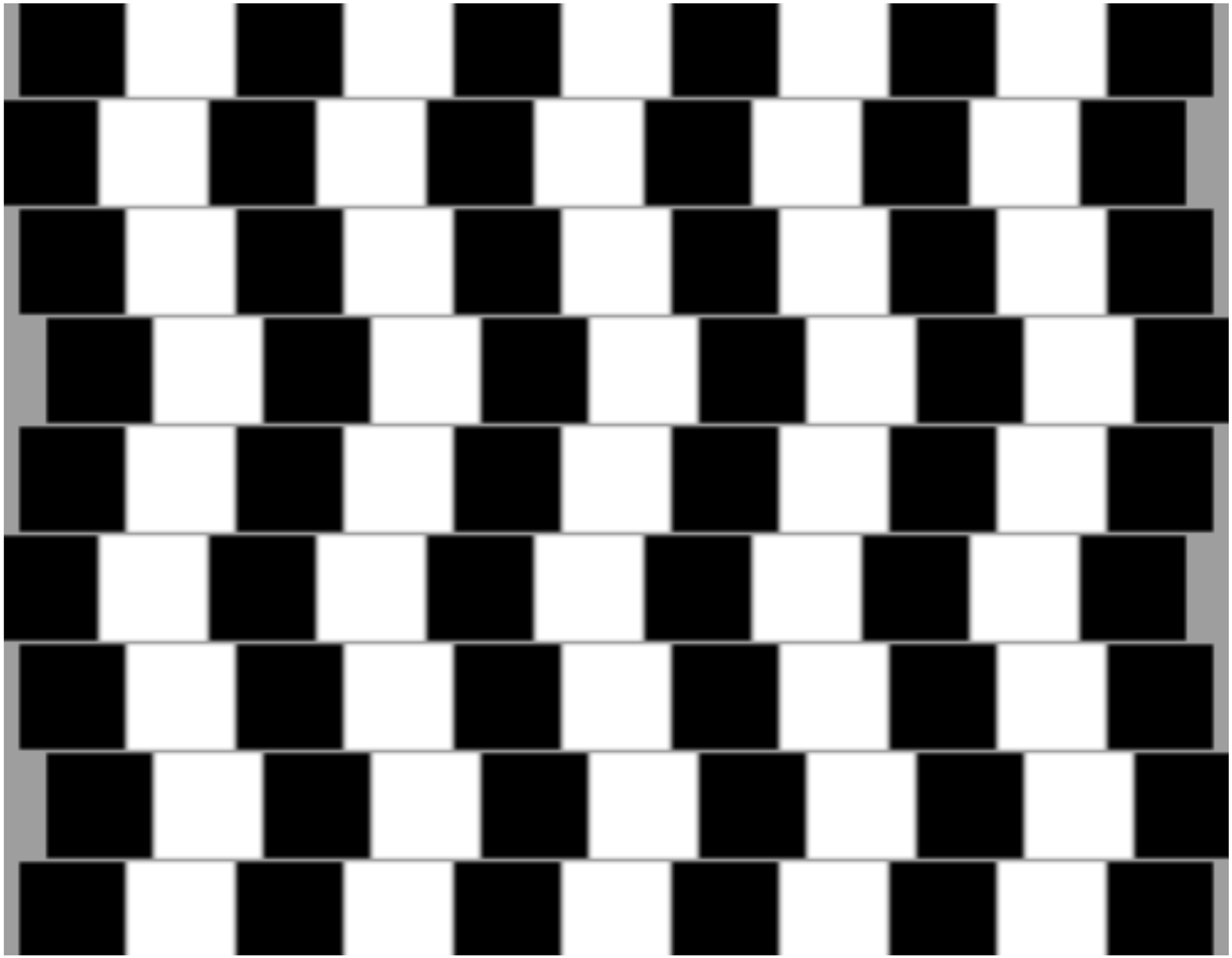
INFERENTIAL RELATION

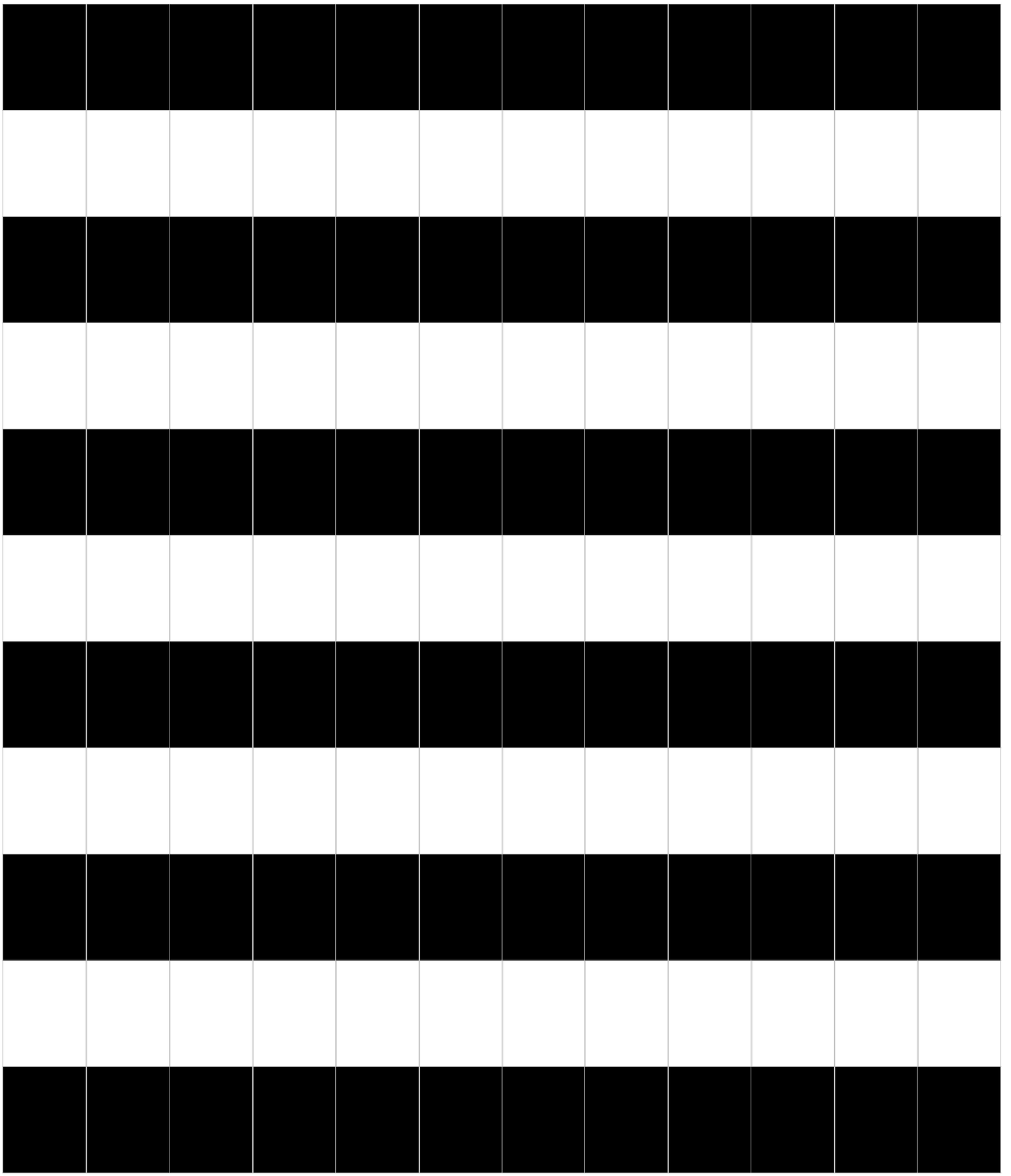
Existing information

New information

We cannot get all the information about the world through our five senses.







Logical thinking enables us to make ***inference*** **(推論)** beyond the information perceived.

Understanding

how to make logical inference

is vital for understanding logical thinking

Fun Exercise!!

Solving Logical Puzzles

Puzzle 1:

Who is doing what?

Alonzo, Kurt, Rudolf, and Willard are four creative artists of great talent. One is a dancer, one is a painter, one is a singer, and one is a writer, though not necessarily in that order.

(1) Alonzo and Rudolf were in the audience the night the singer made his debut on the concert stage.

(2) Both Kurt and the writer have had their portraits painted from life by the painter.

(3) The writer, whose biography of Willard was a best-seller, is planning to write a biography of Alonzo.

(4) Alonzo has never heard of Rudolf.

What is each man's artistic field?

	Dancer	Painter	Singer	Writer
Alonzo	Yes	No	No	No
K				
Rudolf	No	No	No	Yes
Willard	No	Yes	No	No

By Finally, we can know that hat

Kurt is the Singer

Some well-known applications of logical thinking

Example 1

Courtroom argumentations exchange between defense lawyers and prosecutors based on the charge(s) against an accused

Example 2

Parliament debate among members of different political parties based on some policy making proposal

Example 3

Crime Investigation conducted by detectives based on the crime committed

Logic & Knowledge

Logic
&
Everyday
Life

Logic & Profession

Logic & Convincingness

A convincing support for the central idea is the one by which someone can come to believe that the central idea is true.

In order to build a convincing support, it is necessary to learn how to build a logical argument.

Logical Argument

A logical argument is basically a combinatorial product of premise and conclusion, connected in way that exhibits an inferential relation.

Peter is either at his office or at his apartment.

Peter is not at his office.

Therefore, Peter is at his apartment.

Premises

Peter is either at his office or at his apartment.

Peter is not at his office.

Therefore, Peter is at his apartment.

Conclusion

A premise (前提)

is a proposition (命題) upon which inference is based; the proposition that provides grounds or reasons for the conclusion.

A Conclusion (結論)

is a proposition that is affirmed or supported by a premise or a group of premises.

I. M. Copi, C. Cohen, 2005. "Introduction To Logic", p. 7.

Two Kinds of Logical Argument (Inferential Relation)

Deductive Argument (演繹的論証)

In a deductive argument, the inferential relation between the argument's conclusion and its premise(s) exhibits an absolute necessity.

In other words, the conclusion is claimed to follow from its premises with **100% certainty.**

Example of a Deductive Argument

(1) All human beings are mortal.

(2) Peter is a human being.

(3) Therefore Peter is mortal.

If (1) is true, and (2) is also true,

then (3) *must be* true.

All human beings are mortal.
Peter is a human being.
Peter is mortal.

Inductive Argument

In an inductive argument, the inferential relation between the argument's conclusion and its premise(s) exhibits only a probability.

In other words, the conclusion is claimed to follow from its premise(s) with **less than** 100% certainty.

Example of an Inductive Argument

(1) Most corporation lawyers are rich.

(2) Peter is a corporation lawyer.

(3) Therefore Peter is probably rich.

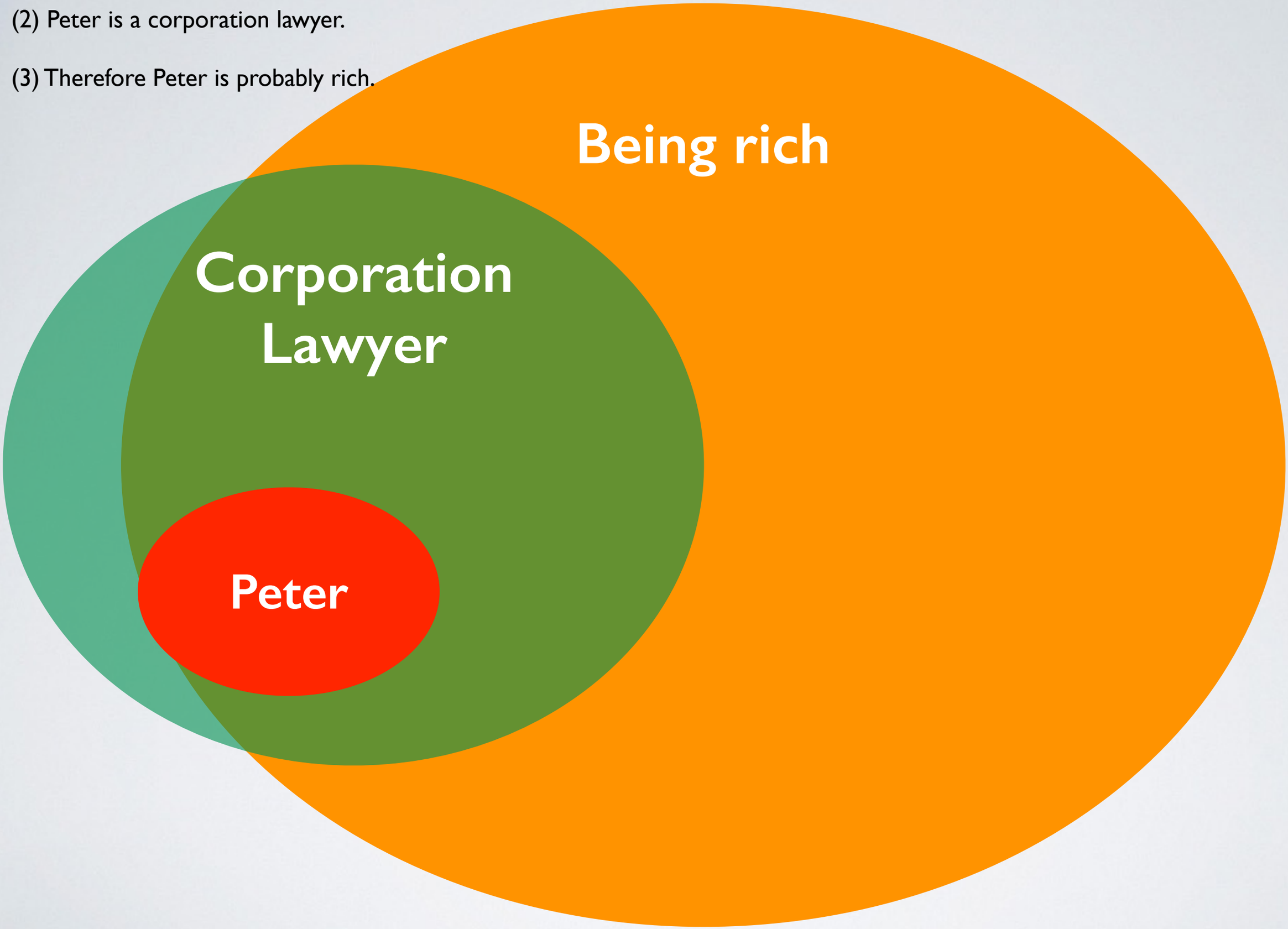
If (1) is true, and (2) is also true,

then (3) *more likely* true than false.

(1) Most corporation lawyers are rich.

(2) Peter is a corporation lawyer.

(3) Therefore Peter is probably rich.



Premise

True

Conclusion

True

Conclusion is true/false

because

the premises are true/false.

Exercises on logical inference 1

Logical Inference

Premise  **Conclusion**

Part A of the exercises is designed to train you how to make a proper inference based on a premise.

Each one of the exercises comes with (i) one statement corresponding to a factual event, and (ii) four inference choices that follow from (i). Although more than one of the four choices might be logical, you need to find out the one that is most likely / certainly true following from the truth of (i).

e.g.

Ex-1. Paul is in London.

(a) Paul is on a business trip.
(b) Paul will not come back to Japan for a while.
(c) Paul is in England.
(d) Paul likes London.

Ex-2. There is a laptop computer found on a classroom desk in Nagoya University.

(a) The computer belongs to Nagoya University.

(b) The computer belongs to one of the students who used the classroom.

(c) Someone has forgotten to take the computer when leaving the classroom.

(d) Someone came to the classroom with the computer.

Ex-3. A car is found parking in an area with the NO PARKING sign.

(a) The car's owner will soon receive an illegal parking ticket.

(b) The car was driven or transported there by someone.

(c) The car was parked by someone who did not notice the NO PARKING sign.

(d) The parked car will cause disturbance to the normal traffic.

Ex-4. Tanaka has a piano in his office.

(a) Tanaka likes to play piano in his office.

(b) The piano is taking some space in the office.

(c) Tanaka’s office is very big.

(d) The piano is used for Tanaka’s work.

Exercises on logical inference 2

Logical Inference

Conclusion  **Premise**

Part B is designed to train you how to find the proper premise for a conclusion.

Each one of the exercises comes with one conclusion and four premises. Find out the premise without which the conclusion is most certainly false. Note that your consideration is restricted to the four possible premises only, and you are supposed to choose, among the four, the one that provides the necessary support for the conclusion. Further note that additional premise or premises may be needed in order to make the conclusion true.

Ex-1. Conclusion: Peter is in Nagoya.

(a): Peter is in the central part of the country.

(b): Peter is meeting some people who live in Nagoya.

(c): Peter is in Asia.

(d): Peter is in the restaurant called “Nagoya Chicken Wings”.

Ex-2. Conclusion: Today is Tuesday.

(a): Today is the second day of the week.

(b): Today is the day for burnable garbage.

(c): Today is the day that Paul teaches the AWC.

(d): Today is not Friday.

Ex-3. Conclusion: Life is found on Mars.

(a): The planetary environment of Mars is similar to Earth.

(b): Hydrogen is found on Mars.

(c): The evolutionary history on Mars is similar to that on Earth.

(d): Some movements are detected on Mars.

Ex-4. Conclusion: Peter submitted his programming assignment on Monday.

Premise (a): Peter is a hard-working student.

Premise (b): Peter cares about his assignment very much.

Premise (c): Peter's computer was working properly before the submission.

Premise (d): Peter went to school early on Monday.

Exercises on logical inference 3