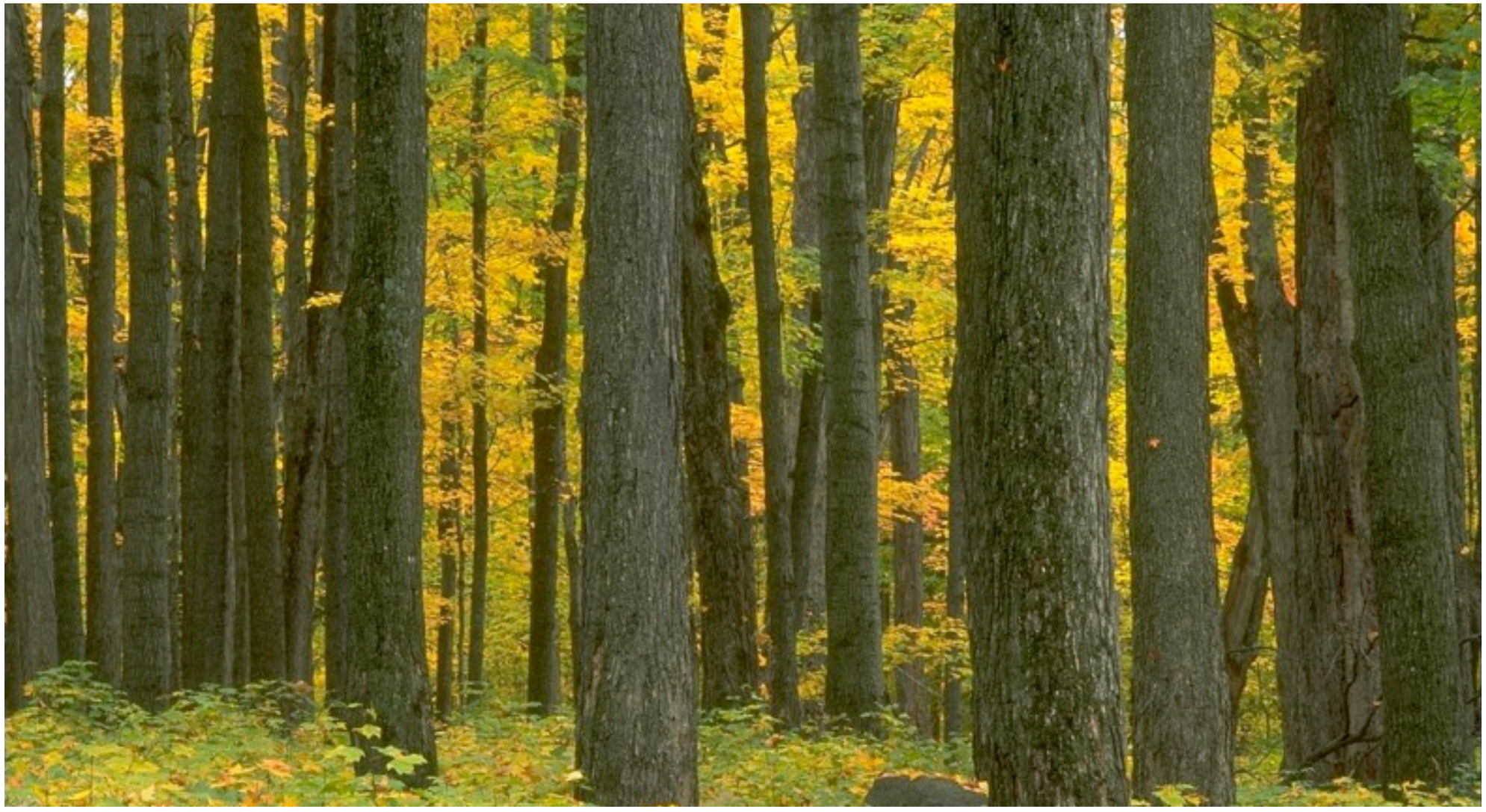
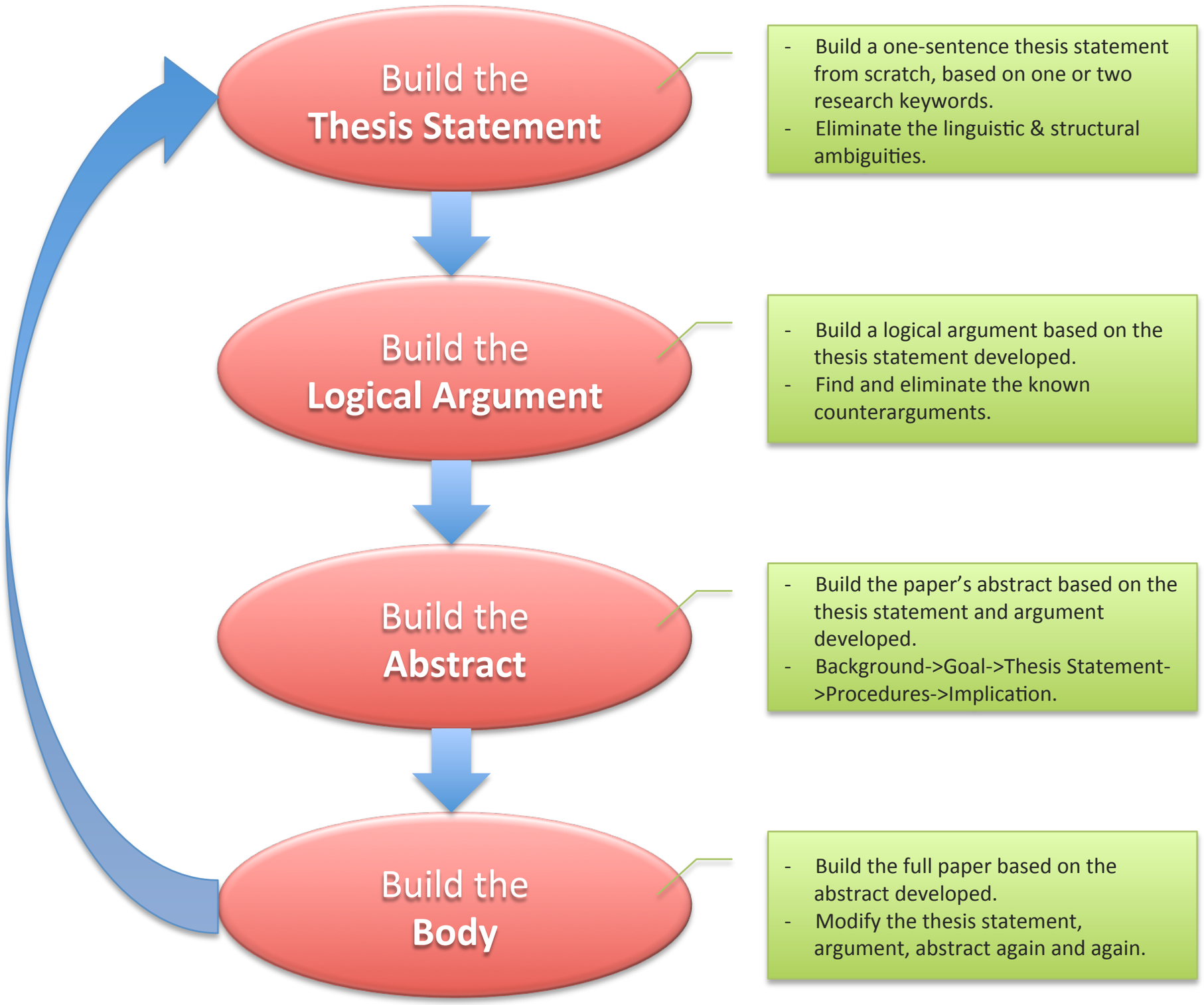


Advanced Logical Thinking Skills (1)

Revisit the concepts of logic

by Paul W. L. Lai

The Logical Writing Process Cycle



What is Logic

Logic is essentially a study of an inferential relation between premise and conclusion.

Premise → **Conclusion**

Consider a typical logical argument:

(1) All human beings are mortal. ✔

(2) Peter is a human being. ✔

(3) Peter is mortal. ✔

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

Consider a typical logical argument:

(1) All human beings are mortal. ✔

(2) Peter is a human being. ✔

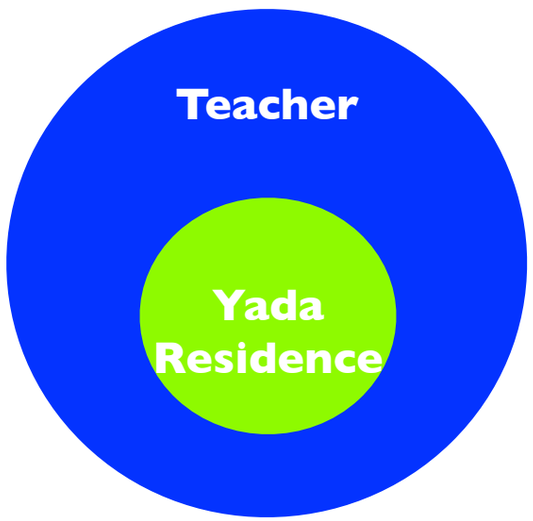
(3) Peter is mortal. ✔

Some examples of logical inference

Some examples of logical inferences

All people who live in Yada Residence are teachers.

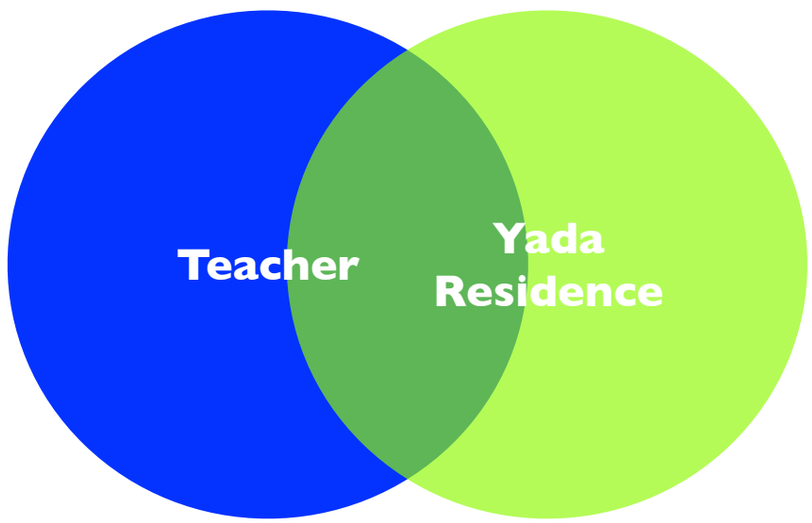
No one who lives in Yada Residence is not a teacher.



Some examples of logical inferences

Some people who live in Yada Residence are teachers.

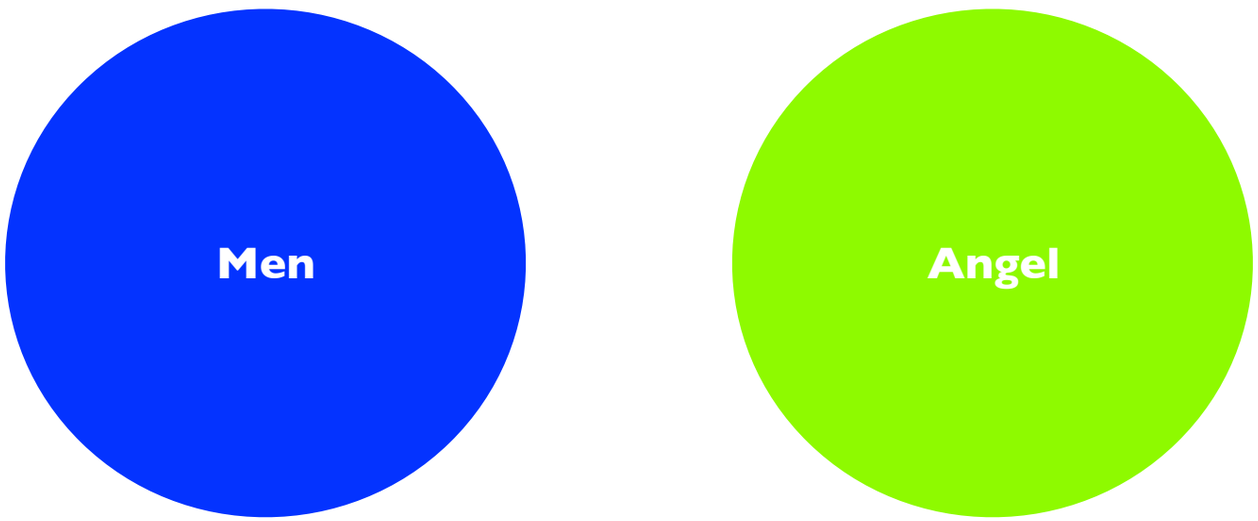
Some people who live in Yada Residence are not teachers.



Some examples of logical inferences

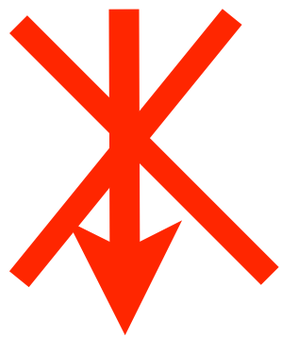
No men are angels.

No angels are men.

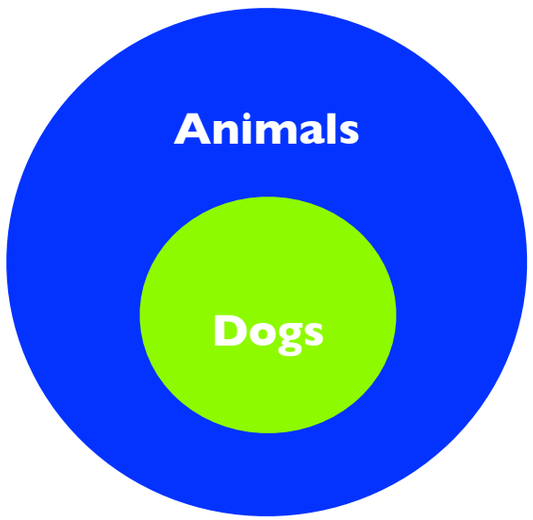


Some examples of logical inferences

All dogs are animals.

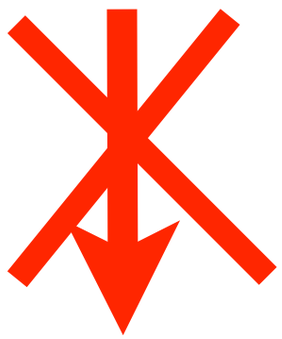


All animals are dogs.

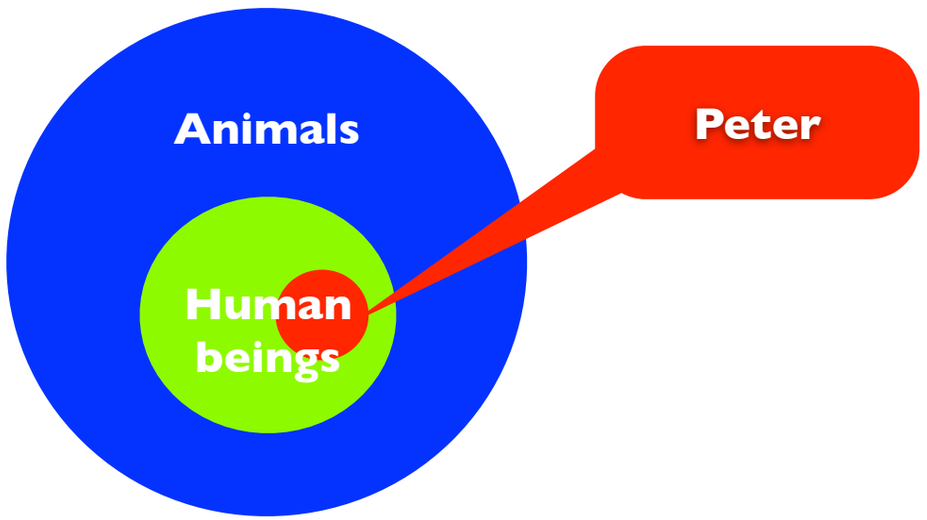


Some examples of logical inferences

All human beings are animals.



Peter is an animal.

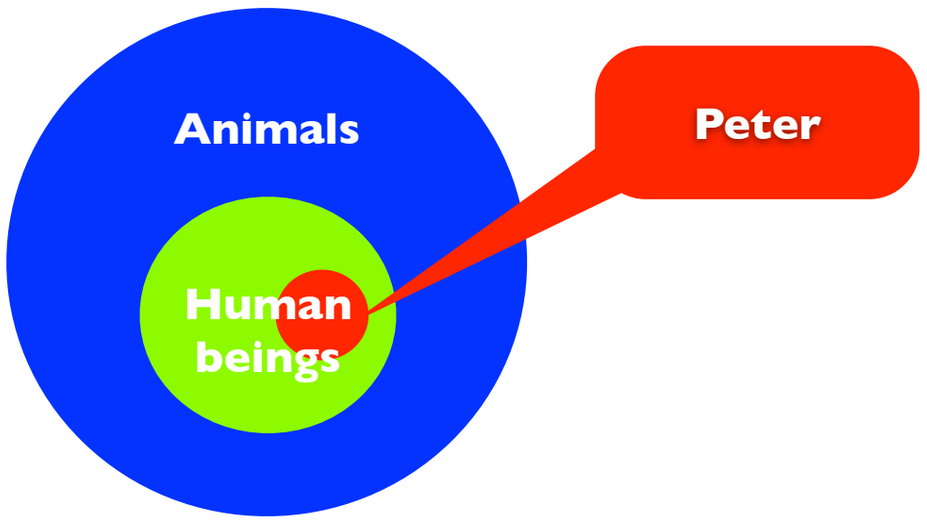


Some examples of logical inferences

All human beings are animals.

Peter is a human being.

Peter is an animal.



A logical relation between P and C is a relation based on which the truth of C can be inferred from the truth of P.

Kinds of logical relation

Certainty

Vs

Probability

Certainty

Deductive Argument

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.

Probability

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.

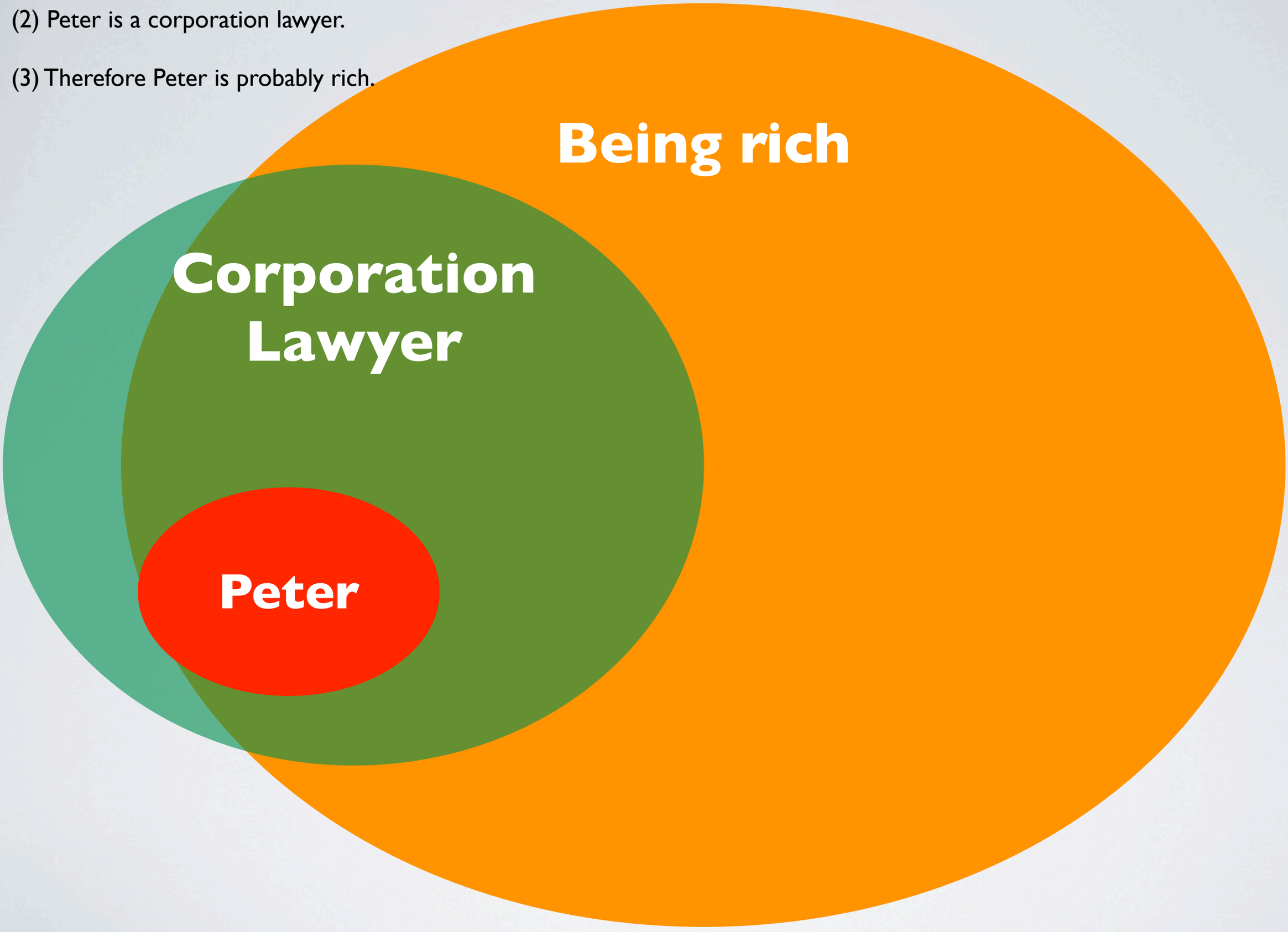
If (1) is true, and (2) is also true,

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.



Group

Vs

Individual

Group

The relation between the categories of objects is basically in one of the three types:

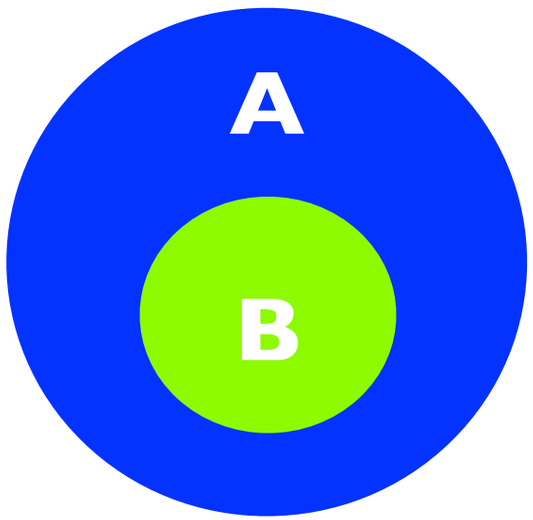
1. Whole Inclusion

2. Partial Inclusion

3. Whole Exclusion

Whole Inclusion

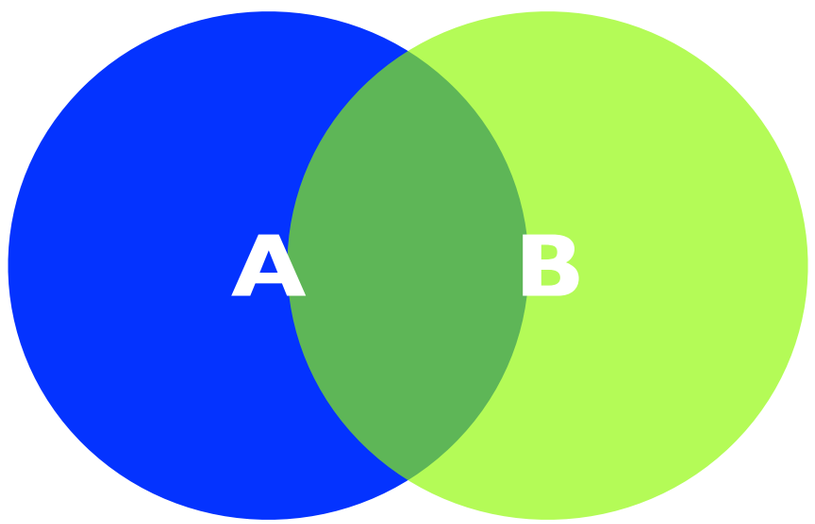
One class of objects, B, is wholly included in another class of objects, A. Thus all members of B are included in A. *e.g. All dogs are mammals.*



Partial Inclusion

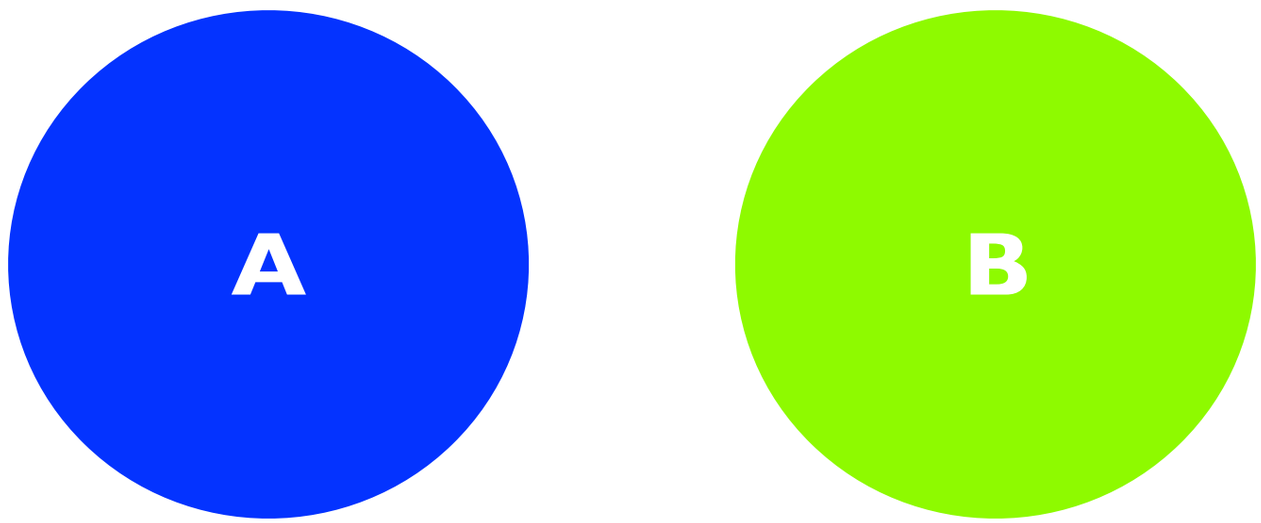
also implies Partial Exclusion

One class of objects, A, is partially included in another class of objects, B. Thus at least one member of A, but not all members of A, is included in B. *e.g. Some athletes are females.*



Whole Exclusion

One class of objects, A, is wholly excluded from another class of objects, B. Thus no member of A is included in B, and vice versa. Or all members of A are excluded from B, and vice versa.
e.g. No circle is a triangle.

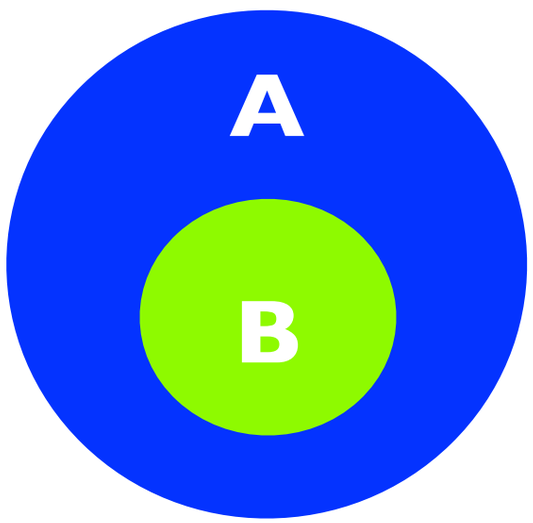


The three types of relationship can be expressed through four kinds of categorical propositions.

1. **Universal affirmative propositions (A)**
2. **Universal negative propositions (E)**
3. **Particular affirmative propositions (I)**
4. **Particular negative propositions (O)**

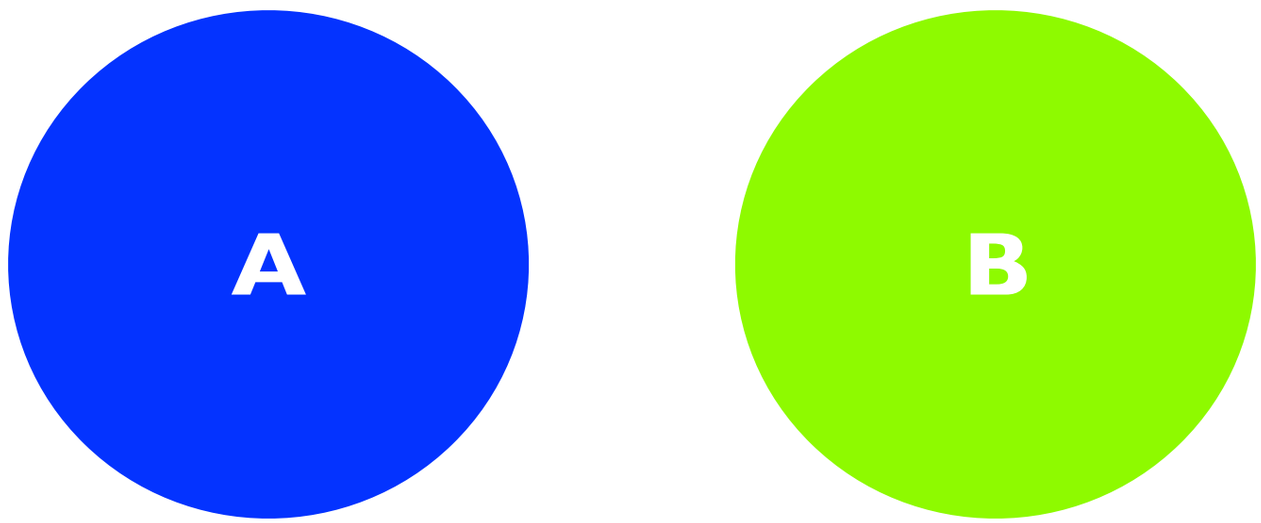
Universal affirmative propositions (A)

One class of objects, B, is wholly included in another class of objects, A. Thus all members of B are included in A. *e.g. All dogs are mammals.*



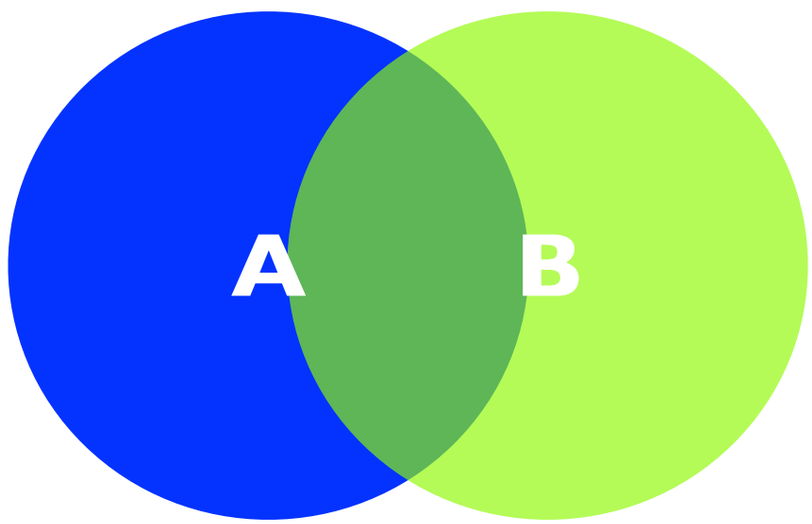
Universal negative propositions (E)

One class of objects, A, is wholly excluded from another class of objects, B. Thus no member of A is included in B, and vice versa. Or all members of A are excluded from B, and vice versa.
e.g. No circle is a triangle.



Particular affirmative propositions (I)

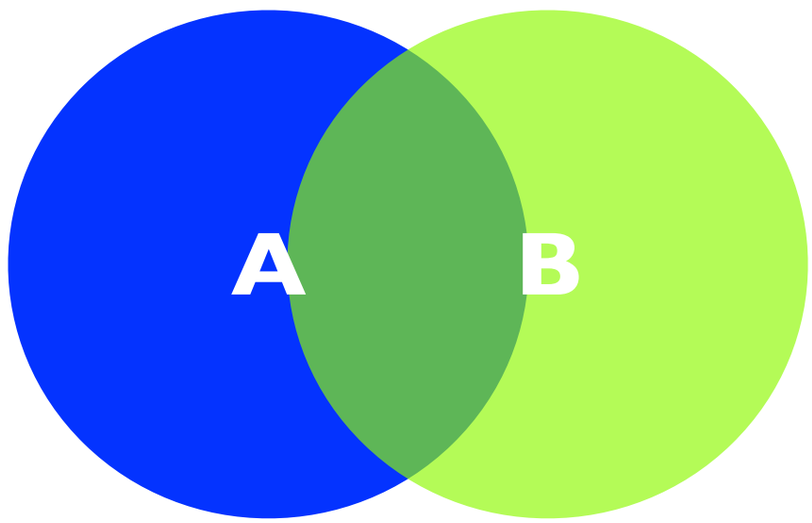
One class of objects, A, is partially included in another class of objects, B. Thus at least one member of A, but not all members of A, is included in B. *e.g. Some athletes are females.*



Particular negative propositions (O)

One class of objects, A, is partially excluded from another class of objects, B. Thus at least one member of A, but not all members of A, is excluded from B.

e.g. Some athletes are not females.



Classwork:

Try building the premises for the following conclusion:

Peter is a very nice guy.

Individual

e.g. Try the following:

I could not submit my homework on Monday
because my computer broke down on Saturday

My computer broke down on Saturday.

I could not submit my assignment on Monday.

My computer broke down on Saturday.

+

The assignment must be done on a computer.

+

No other computer was available during the period.

+

My computer was not repaired in time.

↓

I could not submit my assignment on Monday.

Group Discussion:

Think about your thesis statement again, and judge whether it can be best supported through either

(1) a relation from group to individual

(2) a relation from individual to individual