# CRITICAL THINKING Lecture #8

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Validity & Truth





### Argumentative Form: Instructions

Putting an argument into its "argumentative form" is done as follows:

- Make a numbered list of the premises, I.
- 2. Draw a line below the last premise, and
- 3. means "therefore") in front of it.



Below the line put the main conclusion, but with a ... (called "triple dot", whose symbol



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# Truth & Falsity

Recall that an individual statement is either true or false. A statement is true if and only if what it asserts is actually the case. A statement is false if and only if what it asserts is not the case.

This means that truth and falsity are attributes of individual *statements*. However, it makes no (logical) sense to say that an argument is true or false. This is because an argument is a *collection* of statements, not an individual one.



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# Validity & Invalidity

Instead, we now know that a deductive argument is either valid or invalid. An argument is valid if and only if the truth of its premises logically entails the truth of its conclusion. An argument is invalid if and only if it is logically possible to have true premises but a false conclusion.

This means that validity and invalidity are attributes of *arguments*, which are collections of statements connected by inferences. However, it makes no (logical) sense to say that an *individual* statement is valid or invalid.



# Creating Valid & Invalid Arguments: Instructions

Creating valid and invalid arguments works as follows:

- Be sure to put the argument in argumentative form, I.
- Clearly explain why each statement is either true or false, and 2.
- Clearly explain why argument itself is either valid or invalid. 3.

In doing all this, be sure that your answer clearly demonstrates that you understand all the "facts" that you should use to make your solutions more concrete.

logical concepts involved (true, false, valid, and invalid). I will also provide you with some basic



# Some Basic Facts of Geography

The following information is all true (according to Wikipedia):

City

Berlin, Germany

Pittsburgh, USA

Doha, Qatar

Key West, USA

Sources: "Berlin", 2017; "Pittsburgh", 2017; "Doha", 2017; "Key West, Florida", 2017.

#### Latitude

52° 30′ 26″ N 40° 26' 23" N 25° 17′ 12″ N

24° 33′ 33″ N

### Problem #1

Use these facts to create a *valid* argument with two *false* premises and a *false* conclusion.



# Problem #1: Sample Solution

All these statements are false...

- Doha is further north than Pittsburgh.
- 2. Pittsburgh is further north than Berlin.
- . Doha is further north than Berlin.

It is *valid* because assuming the truth of the premises (for the sake of argument) implies that the conclusion *must absolutely* be true as well. The transitivity of "further north than" guarantees the truth of this conclusion when presuming the truth of those premises.

#### ...and yet this argument is valid!











#### Use these facts to create an *invalid* argument with two *false* premises and a *true* conclusion.



# Problem #2: Sample Solution

Both premise are false...

- 1. Doha is further north than Pittsburgh.
- 2. Pittsburgh is further north than Berlin.
- . Berlin is further north than Doha.

The argument is *invalid* because assuming the truth of the premises (for the sake of argument) implies that the conclusion *must absolutely* be false. The transitivity of "further north than" guarantees the falsehood of this conclusion when presuming the truth of those premises.

burgh. Berlin

...the conclusion is true...

#### ...and the argument is invalid!



Use these facts to create an *invalid* argument with two *true* premises and a *true* conclusion.



Problem #3: Sample Solution

All these statements are true...

- Doha is further south than Pittsburgh.
- Pittsburgh is further south than Evanston. 2.
- . Doha is further south than Key West.

The argument is *invalid* because assuming that the premises are true (for the sake of argument) tells us nothing about whether the conclusion must be true or false. As long as it is possible for the conclusion to be false when the premises are both true, the argument is not valid.

#### ...and yet this argument is invalid!









Next Class...

#### We will do a workshop practicing this process of constructing valid and invalid arguments with true and false statements.





#### References

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