

Logic Primer:

The role for Logic is to teach us how to reason correctly. We're interested in justification of concepts and claims. It deals with the "solidity" & coherence of the points we use to support our main claims.

STATEMENTS, PROPOSITIONS, AND SENTENCES:

Definitions:

Statement- an assertion or denial of something.

Some examples: God exists; God doesn't exist; Jesus is God; the Bible is full of contradictions; You can't know anything for sure; There are no absolute truths; We evolved from lower life forms.

Proposition-assertions or denials, but specifically of class relationships.

Some examples: All whales are mammals. All men are mortal. All mortals are not men. Nothing false is true; All men are human beings.

Sentences-grammatically developed expressions in some language.

Some examples "Who was the first President of the U.S? Will you please be quiet? Stand up!

Note: none of the above sentences are statements, but as you've seen, sentences may or may not be used to make a statement.

Note: Questions, imperatives, exclamations, requests, and other expressions or sentences don't usually qualify as statements (logically), but may imply or contain statements. Statements can be recognized by asking yourself, "Is an assertion or denial being made here?"...for example:

"Is it true or false?"---Although the person asking the question may be asking (with an answer in mind) or may be asking out of pure ignorance, he or she is implicitly *stating* that something must be either true or false (unless context indicates otherwise).

1.4 Arguments

(begin with class experiment/activity).

Logic is concerned with arguments, which are more than mere statements (i.e., assertions or denials that cause us to question its truth or falsity). It is interested in arguments, defined as the "use of one or more statements to support a conclusion."

Said another way, "An argument is a set of statements in which one, called a conclusion, is claimed to be the consequence of or to be justified by the others, called variously *evidence, reasons, grounds, or premises.*"

So every argument consists of 2 parts:

- (1) One or more statements called premises, which give evidence or reasons
- (2) Conclusion, which is "claimed either to follow from the premises or to be supported by the evidence."

*An argument may also be thought of as the implicit or explicit formulation of an "inference", which is the act of drawing a conclusion from one or more facts, or data.

*Inference examines and proceeds from the data, and generates a conclusion, for example:

-The fact that you enjoyed the movie *Mortal Combat*, we might infer that you would enjoy *Crouching Tiger Hidden Dragon*.

-Because the sun does not cease to rise, we might infer that this process will continue..

Diagramming Inference:

*Tangible Data:

Conclusion:

You enjoyed *Mortal Combat*--- →(Reason: *Crouching tiger is similar, ----* →You'll enjoy *Crouching ..*
But more..stunt-filled) probably

*Tangible Data:

Conclusion:

The sun is rising today--- →(reason: sun has always risen, since beginning.)-→The sun will rise tomorrow
Probably

Put another way:

Example 1:

Premise (1) You enjoyed *Mortal Combat*

Premise (2) *Crouching tiger is similar, but more stunt-filled*

Conclusion: You'll probably like *Crouching tiger*

Example 2:

Premise (1): The sun has always risen in the past of human history

Premise (2): The sun has risen today

Conclusion: The sun will probably rise tomorrow.

1.5 Logical Analysis;

Argument can be broken down into 2 forms:

(1) *This is true, therefore that is true -----translation---->Premise(s), THEREFORE conclusion*

(2) *That is true because this is true-----translation---> Conclusion, BECAUSE OF Premise(s).*

...

1.7 Deduction & Induction

-Logic customarily classifies all arguments into 2 branches of arguments

(Definitions)

Deductive Argument: an argument which asserts that the premises (out of logical necessity) imply or entail the conclusion. Put another way, the premises provide sufficient evidence for an irrefutable conclusion.

Inductive Argument: an argument whereby the premises provide only some evidence for the conclusion, thereby making the conclusion more or less *probable*

Example 3. *Determine the kind of argument this is, and why?*

Premise (1) All men are mortals

Premise (2) Corydon is a man.

Conclusion: *Therefore Corydon is mortal.*

...

**(Be extra careful here) This is a logically valid deductive argument, but is not sound given that the initial premise is false, i.e., all men are not mortals. However, we've arrived at a true conclusion, namely that Corydon is mortal. This is the "power" of many deductive arguments. One can easily be fooled into thinking that because the conclusion and second premise were correct, that the whole argument was sound reasoning. However, we strive not to arrive at truth via falsity or mere chance, but rather via truth.*

Note also:

Example 4.

Premise(1) All celestial clouds are made of white chocolate

Premise(2) All white chocolate materializes from drying water.

Conclusion: All celestial clouds come from drying water.

Note that each premise of the above example, when examined by itself, is totally false—but by mere chance, one can arrive at the right conclusion—that all celestial clouds come from drying water.

We can also arrive at a conclusion regarding this (example 3) matter via inductive reasoning:

Example 5.

Premise(1) Bruce is a man, & we've found him to be mortal

Premise(2) Timothy is a man, & we've found him to be mortal

Premise(3) Jerome is a man, and we've found him to be mortal

...

Premise(n)

Inference: There exists some probability that all men are mortal (The probability including that Corydon is mortal as well). Note: if premise (4) said "Jesus Christ is a man, and we've found him to be immortal", we could not infer that all men are mortal, given that our sample data shows otherwise. However, even if the sample data seems to be supporting some broader conclusion, the conclusion can only be probable, at best.

Run back through section 1.4, and re-think as to what nature these arguments are, and why?

Recap:

Deductive example:

Premise(1) All dogs are mammals

Premise(2) All mammals are warmblooded creatures.

Conclusion: All dogs are warmblooded creatures.

The above deductive argument's conclusion needs no further external evidence than what is already contained in the premises. The premises or reasons for the conclusion offer complete justification for the conclusion. It's impossible for the premises 1 and 2 to be true and the conclusion to be false.

Deductive arguments are explicative—ie. They merely spell out or unveil what is already implicitly contained in the premises.

Inductive example:

Premise (1) Hailey likes to write with red *bic* pens

Premise (2) A red *bic* pen was found at last night's crime scene.

What inference(s) can you draw from this data?

>If you've accused Hailey as the guilty suspect, what justifiable reason do you have for this certainty? At most (given these two premises of data), one could infer that the probability exists in which Hailey is the guilty party. Now, if (in addition to the pen being found) it were determined that Hailey had a motive for the crime, and/or that a strand of her hair was found at the crime scene, the probability for her being the guilty party would increase, and the inductive argument would be *strengthened*. Likewise, if the only added premises were that the crime scene and Hailey's house are 3,000mi apart, and some native's fingerprints were found on the *bic* pen, then the probability of her being the guilty party is decreased, and any such argument in accusation of her is *weakened*.

Inductive argument conclusions or inferences contain information that is not even contained implicitly in the premises—hence they are called “ampliative” arguments. Amount and type of evidences are key in substantiating inductive arguments.

1.8 Logic and the Question of Truth

As far as logic is concerned, it is concerned with the *correctness* of logical statements—not necessarily with the truth or falsity of the premises—(although I'll be teaching both for our purposes)-

The 'correctness' of deductive arguments is measured by whether they are valid (abiding by logical rules). The 'correctness' of inductive arguments is measured by how probable the conclusions are...and this is, in turn, determined by how well the premises substantiate that conclusion (i.e., by the amount and type of evidence provided in the premises)...So logic's main concern is with the second question, below:.

***In evaluating arguments, there are 2 basic queries we need to pose:*

- 1. The fact-oriented, scientific question of truth and falsity—Are the statements contained in the argument true or are they false?*
- 2. The logical question of support/substantiating: How well do the premises support/give evidence for the conclusion?*

Note: the goal of determining the truth or falsity of a claim is primarily the responsibility of the discipline in which that claim is being made; however, since logic can be applied to any field, it can be used to assess the power of the arguments and evidences that are supporting statements/claims, in whatever field they may be made.

(Much material here is compiled from Kegley and Kegley, "Introduction to Logic" 1978, Merrill Publishing Co.)