PHILOSOPHY 220

Basic Notions of Logic 1

TRUTH-PRESERVATION

- A method of reasoning is truth-preserving if it never takes one from truths to a falsehood.

- Deductive reasoning (when done properly) is truth-preserving.

- Truth: While notions of truth are controversial in philosophy, for the purposes of this course 'true' will refer to what is the case, and 'false' will refer to what is not the case.

ARGUMENTS

- An argument is a set of statements designed to justify a further statement.
- The statement being justified is known as the conclusion.
- The statements doing the justifying are known as the premises.

STANDARD FORM

- An argument presented in the following format is considered to be presented in standard form:
  - Premise 1
  - Premise 2
  - …

  - Conclusion
- Formal logic is called formal because it primarily treats *forms* of arguments as opposed to particular arguments.

ARGUMENT FORMS

- Consider the argument:
  - If it is raining, then the ground is wet
  - It is raining
  - The ground is wet
- This argument's *form* is as follows:
  - If R then W
  - R
  - W

P1: IF THEN

P2:

C:

VALIDITY

- Any argument form that is always truth-preserving is called a <u>valid</u> argument form. Any argument form that is not valid is called invalid.

- The previous argument form (known as Modus Ponens) is a valid argument form.

- Now consider the argument:
  - If Neal Stephenson wrote the Bible, then Neal Stephenson is a great author.
  - Neal Stephenson wrote the Bible.
  - Neal Stephenson is a great author.

- Is this argument truth preserving?

SOUNDNESS

- Yes, the previous argument is truth-preserving. We can identify it as having the form known as Modus Ponens.

- That an argument is of a truth-preserving form is not a guarantee that it is true. IF the premises were true, then the conclusion would preserve that truth.

- A <u>sound</u> argument is one that is valid, *and* whose premises are true.

- We will not examine soundness to any great extent. Logic is most concerned with determining which argument forms are valid.

Truth-Value

- The text speaks of 'true' and 'false' being properties of *sentences*.

- This is a moderately controversial claim in philosophy, but will not come to much as the authors of the book are consistent in their usage.

- The primary rival to this way of speaking is to say that 'true' and 'false' are properties of *propositions*.
  - On this view, sentences *express* propositions the way that a numeral like '3' expresses the number 3. (Numbers do not hang on the sides of houses, numerals do.)
  - This view also explains why two different sentences: "the girl carries the water" and "puella aquam portat" have the same truth-value – because both sentences express the same proposition.

TRUTH-VALUE

- In any case, any given proposition (or sentence) is true if it refers to what is the case, and false if it refers to what is not the case.

- Some categories of sentences do not express propositions, or do not refer to what is or is not the case. These sentences have no truth-value, and thus are never used in arguments.

- For example:
  - Questions
  - Imperatives (requests or commands)
  - Exclamations (yikes, boo, yay, ouch, etc.)

Exercise 1.3

- Among those sentences assigned, sentences c, i, k, and m are excluded from the text due to lacking a truth-value. Other excluded sentences are d, j, l, n.

- The only way to permit sentences like i and m in the scope of this text is to restrict indexicals (e.g. 'this') to be non-self-referential. This approach comes with its own set of problems. For our purposes it's a simple enough matter to disqualify paradoxical statements from consideration.