

Arguments and Paradoxes
Handout
January 22, 2001

1. Deductively valid arguments

We can take an **argument** to have two parts (i) a set of sentences: the **premises**, and (ii) a single sentence, the **conclusion**.

Equivalent notions:

An argument is **deductively valid**

The premises **imply** or **entail** the conclusion

The conclusion **follows from** or **is a logical consequence of** the premises

If the premises are true, the conclusion must be true

2. Soundness

A sound argument is one which is valid and all of whose premises are true.

3. Some types of valid argument

Modus ponens

If P, then Q

P

Therefore, Q

Modus Tollens

If P, then Q

Not Q

Therefore, not P

Leibniz's Law (positive version)

...a...

a = b

Therefore, ...b...

Leibniz's Law (negative version)

...a...

Not ...b...

Therefore, not a = b

4. Two notions of validity

5. Consistency and inconsistency

We say that a set of sentences is **inconsistent** when they can't all be true (as a matter of logic)

The argument 'P1, P2, ... therefore C' is valid just in case the set {P1, P2, ..., not-C} is inconsistent

We will call the sentence P inconsistent when the set {P} is inconsistent

Contradictions are sentences of the form 'P and not P'. All contradictions are inconsistent.

When a sentence must be true (as a matter of logic), we say that it is **logically true**. (The word 'valid' is also used for this property of sentences.)

5. Good arguments and valid arguments

6. The fallacy of equivocation

7. Paradoxes

A **paradox** is a set of sentences which seem to be inconsistent, and each of which seems to be true.