

Logic I: Lecture 01

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Readings refer to sections of the course textbook, *Language, Proof and Logic*.

1. The Pigs of Logic

Reading: §1.1, §1.2, §2.1

Argument 1:

Either it went up the left fork or it went up the right fork.

It didn't go up the left fork.

therefore:

It went up the right fork.

Argument 2:

Either it went up the left fork or it went up the right fork.

The left fork is unsuitable for pigs.

therefore:

It went up the right fork.

awFOL version of Argument 1:

$$\begin{array}{|l} P \vee Q \\ \hline \neg P \\ \hline Q \end{array}$$

2. Logic-Ex

There are logic exercises associated with each lecture. After each lecture (or before, if you prefer), you should complete the associated exercises.

You can find links to the exercises for each lecture at: <http://logic-1.butterfill.com>

To complete the exercises you need to register at <http://logic-ex.butterfill.com> (If you don't want to do this, you can complete the alternative textbook exercises on paper. These are also specified for each lecture at <http://logic-1.butterfill.com>).

Seminars will discuss exercises associated with the previous week's lectures. As your seminar tutor will track your progress and mark your exercises, you should be sure to **complete the exercises by 2pm on the day before your seminar**.

3. Why Logic?

'If a card has a vowel on one side, then it has an even number on the other side.' (Wason & Johnson-Laird 1972)

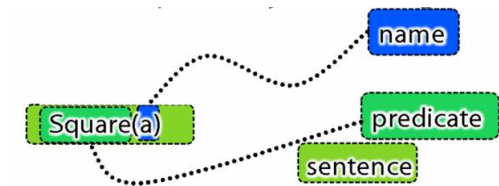


'Logic pervades the world: the limits of the

world are also its limits.' (Wittgenstein, Tractatus 5.61)

4. Quick Intro to awFOL

Reading: §1.1, §1.2, §1.3



A formal language enables us to avoid ambiguity, e.g.:

This is a hospital where doctors are trained.

A formal language also enables us to some avoid appearance–reality problems:

Many more people have been to Paris than I have.

5. Logically Valid Arguments

Reading: §2.1

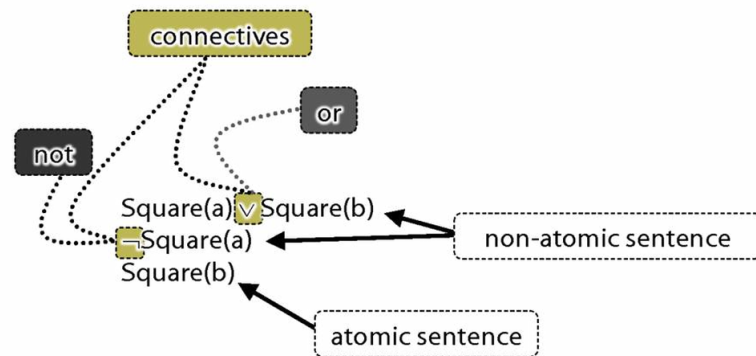
An argument is *logically valid* just if there's no possible situation in which the premises are true and the conclusion false

A *connective* joins one or more sentences to make a new sentence. E.g. 'because', '¬'. The sentences joined by a connective are called *constituent sentences*.

E.g. in ' $P \vee Q$ ',

\vee is the connective

P, Q are the constituent sentences



situation in which its premises are T and its conclusion F.

There are no counterexamples to a logically valid argument.

If an argument is not valid, then there is a counterexample to it.

To show that an argument is not logically valid, we specify a counterexample to it.

6. Counterexamples

Reading: §2.5

A *counterexample* to an argument is a possible