

## 305 Lecture 02 - The Nature of Logic

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# Arguments

Logic studies certain properties of arguments.

An argument, in the sense we're interested in, has two parts:

1. Premises
2. Conclusion

## Example

1. All kangaroos are wise.
2. Skippy is a kangaroo.

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Skippy is wise.

# Premises

1. All kangaroos are wise.
  2. Skippy is a kangaroo.
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Skippy is wise.

The **premises** go above the line, and are numbered.

# Conclusion

1. All kangaroos are wise.
2. Skippy is a kangaroo.

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Skippy is wise.

The **conclusion** goes below the line, and is not numbered.

# The Premise Set

1. All kangaroos are wise.
2. Skippy is a kangaroo.

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Skippy is wise.

There can be zero, one or multiple premises. Formally, we'll say there is a set of premises.

# Zero Premises

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All men are created equal.

# One Premise

1. The cinema is closed.

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We shouldn't go to the cinema.



# Conclusion

1. All kangaroos are wise.
2. Skippy is a kangaroo.

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Skippy is wise.

But we don't allow this flexibility to conclusions; arguments have a single conclusion.

# Chained Arguments

- Sometimes a conclusion of one argument will go to be a premise in another argument.
- But any given argument aims to prove just one thing.

# Representation

1. All kangaroos are wise.
2. Skippy is a kangaroo.

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Skippy is wise.

When I write arguments like this, I'm merely presenting them, not asserting that they have any nice features.

# Virtues of Arguments

What are some virtues of arguments that you can think of? What makes for a good argument?

# Virtues of Arguments

- Premises are true.

# Virtues of Arguments

- Premises are true.
- Premises are known.

# Virtues of Arguments

- Premises are true.
- Premises are known.
- Premises are accepted in debate.

# Virtues of Arguments

- Premises are true.
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- Premises are evidence for the conclusion.



# Virtues of Arguments

- Premises are true.
- Premises are known.
- Premises are accepted in debate.
- Premises are evidence for the conclusion.
- Premises guarantee the truth of the conclusion.

To a first approximation, logic is about the last of these virtues.

- Does the truth of a set of premises **guarantee** the truth of the conclusion?

Logic isn't just about guarantees though. It's about a special kind of guarantee, one that holds in virtue of the structure of the premises and conclusion.

# Non-Structural Guarantee

Compare the Skippy argument with this one.

1. Today is Wednesday.

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Tomorrow is Thursday.

The premise guarantees the truth of the conclusion, but it does so in virtue of meanings of 'Wednesday' and 'Thursday', not structural features.

## Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

1. All kangaroos are wise.
2. Skippy is a kangaroo.

---

Skippy is wise.

## Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

1. All kangaroos are wise.
2. Lucky is a kangaroo.

---

Lucky is wise.

## Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

1. All koalas are wise.
2. Lucky is a koala.

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Lucky is wise.

## Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

1. All koalas are dishonest.
2. Lucky is a koala.

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Lucky is dishonest.



# Terminology

- We'll say an argument is **valid** just in case the truth of the premises guarantees the truth of the conclusion.
- We'll say an argument is **sound** just in case it is valid and has true premises.
- We won't have much interest here in soundness; just in validity.

# Validity

Here are some equivalent ways to define validity.

- An argument is valid if necessarily, when the premises are true, the conclusion is too.
- An argument is valid if it is impossible for the premises to be true and the conclusion to not be true.

We'll use that last formulation a lot.