

Logic Tutorial 3

David Pomerence

linktr.ee/davidpomerence

Overview

- ▶ 11:00 Criticisms of logic
- ▶ 11:05 Recap
- ▶ 11:10 **Q&A**
- ▶ 11:50 Quiz
- ▶ 12:00 **Q&A**
- ▶ 13:00 Nap time

Reminder

- ▶ Practice old exams!



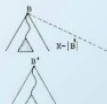
STOP DOING LOGIC

- ARGUMENTS WERE NOT SUPPOSED TO BE FORMALIZED
- SO MANY RULES yet NO REAL-WORLD USE FOUND for going beyond MODUS PONENS
- Wanted to prove things anyway for a laugh? We had a tool for that: It was called "INDUCTION"
- "Hello, how are $\Diamond a_{n+1} / \neg(a_{n+1} \triangleright \neg c_{n+1})$ doing? Isn't the weather $\forall \phi (\Box_V \phi \rightarrow \Box_{U \cup \{Con^f(V)\}} \phi^f)$ today?" - Statements dreamed up by the utterly Deranged

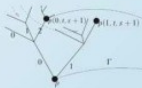
LOOK at what Logicians have been demanding your Respect for all this time, with all the arguments and languages we built for them
(This is REAL Logic, done by REAL Logicians):



?????



??????



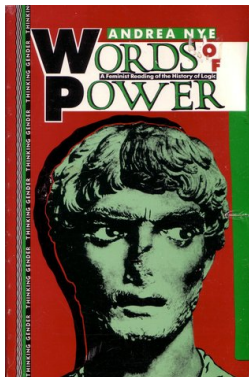
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""""You hAVe to bE logicAl""""

They have played us for absolute fools

Criticisms of logic

- ▶ The logic research community is not inclusive.
- ▶ Logic itself is “a thought like a hammer” (authoritarian, patriarchal).



Criticisms of logic - Reactions

- ▶ The logic research community is not inclusive.
 - ▶ Women in Logic
 - ▶ Summer school in mathematical philosophy for female students
- ▶ Logic is “a thought like a hammer” (authoritarian, patriarchal).
 - ▶ Taking into account uncertainty
 - ▶ Ranking theory
 - ▶ Taking into account exceptions and counterarguments
 - ▶ Formal argumentation, defeasible logic
 - ▶ Taking into account inconsistencies
 - ▶ Catuskoti

Catuskoti / Paraconsistent logic!

Catuṣkoṭi

Both A & Not-A

Neither A Nor Not-A



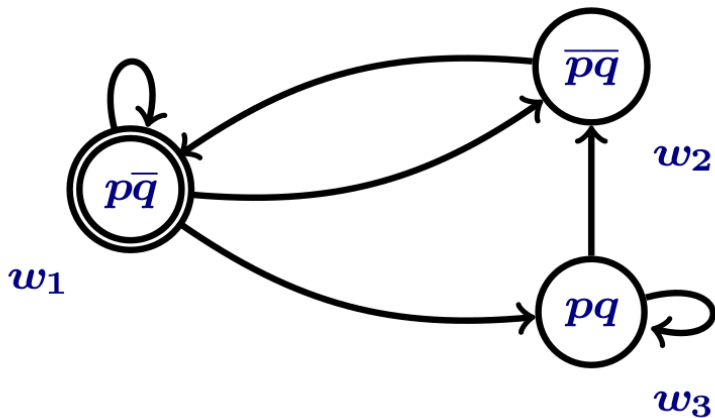
A

Not-A

Recap

- ▶ Epistemic logic
- ▶ Dynamic logic

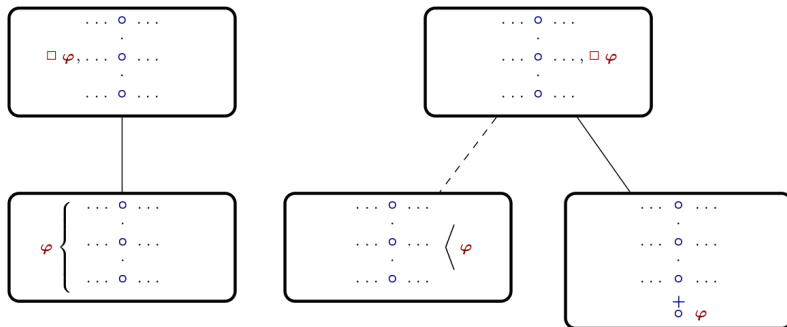
Accessibility relations



Semantic Tableau

\neg	$\begin{array}{c} \neg\varphi \circ \\ \\ \varphi \circ \end{array}$	$\begin{array}{c} \circ \neg\varphi \\ \\ \varphi \circ \end{array}$
\wedge	$\begin{array}{c} \varphi \wedge \psi \circ \\ \\ \varphi, \psi \circ \end{array}$	$\begin{array}{c} \circ \varphi \wedge \psi \\ / \quad \backslash \\ \circ \varphi \quad \circ \psi \end{array}$
\vee	$\begin{array}{c} \varphi \vee \psi \circ \\ / \quad \backslash \\ \varphi \circ \quad \psi \circ \end{array}$	$\begin{array}{c} \circ \varphi \vee \psi \\ \\ \circ \varphi, \psi \end{array}$
\rightarrow	$\begin{array}{c} \varphi \rightarrow \psi \circ \\ / \quad \backslash \\ \circ \varphi \quad \psi \circ \end{array}$	$\begin{array}{c} \circ \varphi \rightarrow \psi \\ \\ \varphi \circ \psi \end{array}$
\leftrightarrow	$\begin{array}{c} \varphi \leftrightarrow \psi \circ \\ / \quad \backslash \\ \varphi, \psi \circ \quad \circ \varphi, \psi \end{array}$	$\begin{array}{c} \circ \varphi \leftrightarrow \psi \\ / \quad \backslash \\ \varphi \circ \psi \quad \psi \circ \varphi \end{array}$
\exists	$\begin{array}{c} \exists x\varphi(x) \circ \\ \\ \varphi(a) \circ \\ \text{For a new } a \end{array}$	$\begin{array}{c} \circ \exists x\varphi(x) \\ \\ \circ \varphi(a_1), \dots, \varphi(a_n) \\ \text{For all existing } a_1, \dots, a_n \end{array}$
\forall	$\begin{array}{c} \forall x\varphi(x) \circ \\ \\ \varphi(a_1), \dots, \varphi(a_n) \circ \\ \text{For all existing } a_1, \dots, a_n \end{array}$	$\begin{array}{c} \circ \forall x\varphi(x) \\ \\ \circ \varphi(a) \\ \text{For a new } a \end{array}$

Semantic Tableau - Modality



Quiz

- ▶ Tahook

Feedback

Anonymous feedback form:

- ▶ linktr.ee/davidpomerenke