

Logic (PH133): Lecture 3

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

1. \wedge Intro and \vee Intro: Compare and Contrast

Reading: §6.1

1. R	
2. S	
3. $R \vee T$	\vee Intro: 1
4. $S \wedge (R \vee T)$	\wedge Intro: 2,3

Let us define a new connective with this truth table:

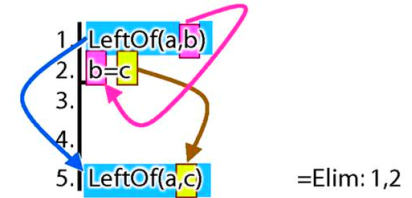
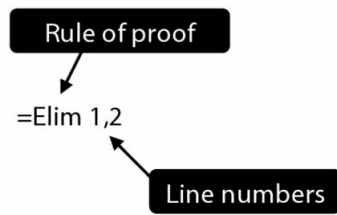
P1	P2	$P1 \vee P2$	$P1 \not\leftrightarrow P2$
T	T	T	F
T	F	T	T
F	T	T	T
F	F	F	F

The following rule is unacceptable. Why?

$\not\leftrightarrow$ Intro:	
P _i	
...	
P ₁ $\not\leftrightarrow$ P ₂	

2. How to Write Proofs

- | | |
|----------------|--|
| 1. LeftOf(a,b) | |
| 2. b=c | |
| 3. LeftOf(a,c) | |



3. Rules of Proof for Identity

Reading: §2.2

Identity Introduction (= Intro)

\triangleright $n = n$

Identity Elimination (= Elim)

P(n)	
⋮	
n = m	
⋮	
\triangleright P(m)	

\perp Introduction (\perp Intro)

P	
⋮	
\neg P	
⋮	
\triangleright \perp	

P	\neg P	\perp
T	F	F
F	T	F

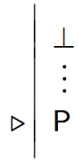
4. Logic Makes Me Die Inside

Reading: §2.1

5. \neg , \perp

Reading: §6.3

\perp Elimination
 (\perp Elim)



8. $A \wedge B \vee C$: They Are Different

Argument 1
 \vdash 1. $(A \wedge B) \vee C$
 2. $A \wedge (B \vee C)$

Argument 2
 \vdash 1. $A \wedge (B \vee C)$
 2. $(A \wedge B) \vee C$

6. $A \wedge B \vee C$

Reading: §3.5

Ambiguity can be *lexical*, e.g. ‘Actor testifies in horse suit’. Ambiguity can also be *syntactic*, e.g. ‘How to combat the feeling of helplessness with illegal drugs’. (Both examples are from Bucaria, C. (2004), ‘Lexical and syntactic ambiguity as a source of humor: The case of newspaper headlines’, *Humour* 17(3): 279–309.)

7. $A \wedge B \vee C$: the Truth-tables

A	B	C	$(A \wedge B) \vee C$	$A \wedge (B \vee C)$
T	T	T	T	T
T	T	F	T	T
T	F	T	T	T
T	F	F	F	F
F	T	T	T	F
F	T	F	F	F
F	F	T	T	F
F	F	F	F	F