Logic I: Lecture 09

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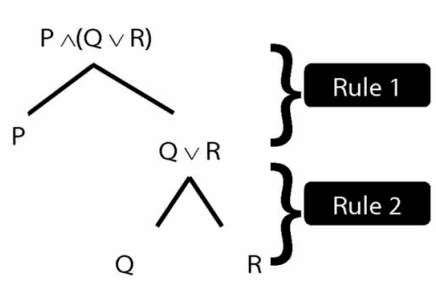
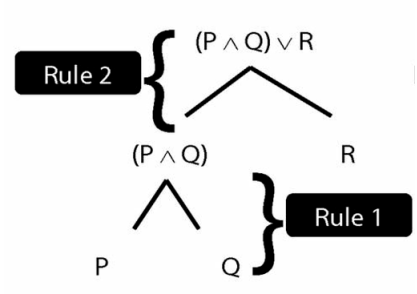
Readings refer to sections of the course textbook, *Language, Proof and Logic.*

1. Recap: Scope

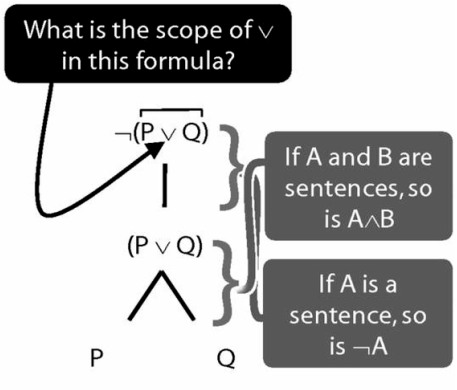
Reading: §3.5

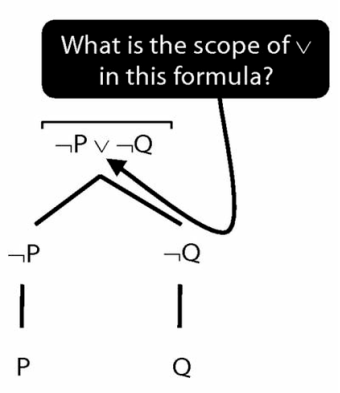




2. Scope and Negation

Reading: §3.5, §3.6





3. I Met a Philosopher

Reading: §9.2, §9.3, §9.5

4. Translation with Quantifiers

Reading: §9.5, §9.6

All discordians weep:
∀x(Dscrdn(x) ⟶ Wps(x))

All **French** discordians weep:
∀x((**Frnch(x)** ∧ Dscrdn(x)) ⟶ Wps(x))

All French discordians weep **and wail**:
∀x((Frnch(x) ∧ Dscrdn(x)) ⟶ (Wps(x) ∧ **Wls(x)**))

All French discordians weep and wail **except Gillian Deleude**:
∀x((Frnch(x) ∧ Dscrdn(x) ∧ ¬**(x=a)**) ⟶ (Wps(x) ∧ Wls(x)))

5. Scope and Quantifiers

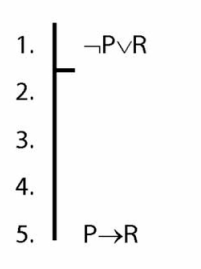
Reading: §9.5, §9.6

Underlining shows the scope of the quantifiers:

"All squares are blue"
∀x (Square(x) → Blue(x))

"If everything is square, everything is blue"
∀x Square(x) → **∀x Blue(x)**

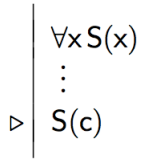
6. Proof Example: ¬P∨R therefore P⟶R



7. ∀Elim

Reading: §13.1

Universal Elimination
(∀ Elim)



8. Exercises

These exercises will be discussed in seminars the week after this lecture. The numbers below refer to the numbered exercises in the course textbook, e.g. '1.1' refers to exercise 1.1. on page 39 of the second edition of *Language, Proof and Logic*. Exercises marked '*' are optional.

3.14

3.15

9.1 odd numbers only

9.2 even numbers only

9.4

9.5

9.8

9.9

9.10

9.12