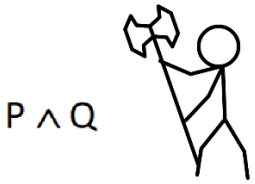
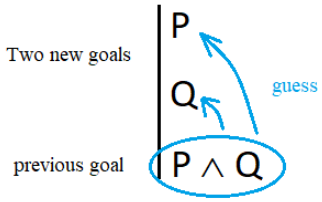
Philosophy 1102: Introduction to Logic
Langara College

Basic Moves (a.k.a. the batting order, or things to try)

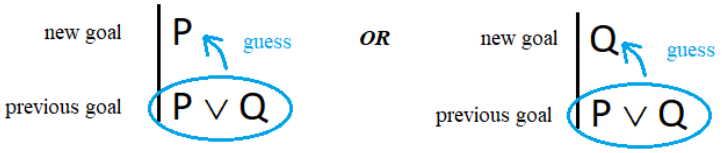
1. Eliminate conjunctions. Just do it already!!



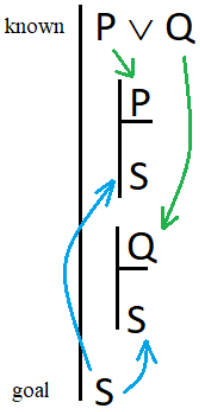
2. To prove P ∧ Q, guess that you will first prove P **and** first prove Q. In effect, instead of one big goal, P ∧ Q, you have two smaller goals (P, and Q).



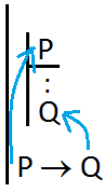
3. To prove P ∨ Q, guess that you will first prove P, **or** first prove Q. (You only need *one* of these, so pick the one that looks more likely to work.)



4. If you have a known disjunction, use ∨Elim to check each possibility.



5. If your goal is a conditional, then use → Intro.



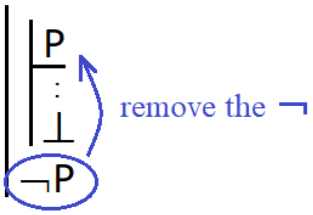
6. If you have a known conditional P → Q, then you *need P* before you can eliminate it. Remain alert, so that you notice if you derive or assume P. Don't just assume P on the grounds that you need it though. (Unless you're desperate -- see "lucky" #13 below.)

7. Keep a good look out for contradictions. If you see an implicit contradiction between sentences you believe or assume, then try to derive ⊥. If you need something other than ⊥, then you can immediately get it using ⊥ Elim.

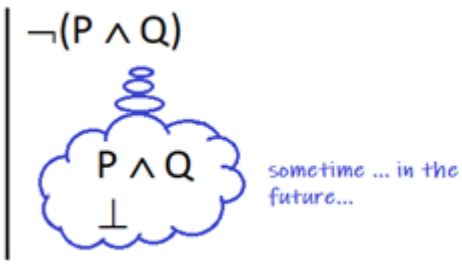
P

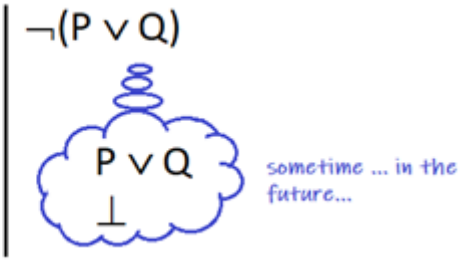
¬P

8. To prove a negation, use ¬Intro.

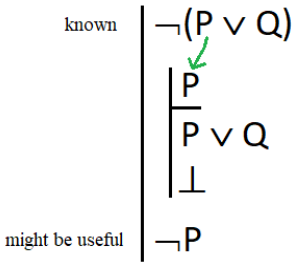


9. To eliminate ¬(P ∧ Q), or ¬(P ∨ Q), you … can't! You *can* use such an unbreakable sentence to prove ⊥.



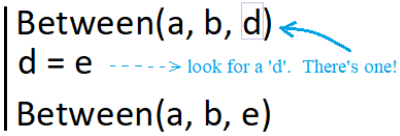


10. Use the 'Logic for Dummies' trick when you already know something like ¬(P ∨ Q). Assume one disjunct (P, say), use ∨Intro to get P ∨ Q, and then get ⊥. This gives you ¬P by ¬Intro. You can get ¬Q in the same way.

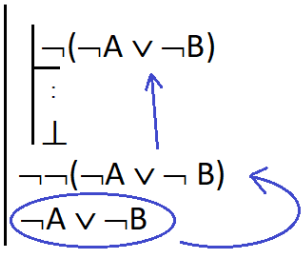


11. If you have an equation, say d = e, then you can think of it as a surgeon that wants to do a transplant, removing a 'd' and replacing it with 'e'. So look for a suitable 'patient', i.e. a sentence (which may *also* be an equation) with an 'd' in it somewhere, and do the transplant.

E.g.



12. If you're stuck, and none of the above helps, then try ¬Intro. (Even if your goal isn't a negation sentence. To prove P, assume ¬P, and try to derive ⊥. If you succeed, you can write down ¬¬P outside the subproof, and then get P by ¬Elim. E.g.



13. Assume something, whatever you like. (This isn't likely to help, but hey, 13 might be your lucky number!)

14. PANIC!! (This isn't likely to help either. And you don't have time.)

Summary:

1. Eliminate conjunctions.
2. Prove each part of a conjunction separately.
3. Guess that you'll prove a disjunction by $\vee$Intro.
4. If you know that a disjunction is true, use $\vee$Elim on it.
5. To prove a conditional, use $\rightarrow$ Intro. Always.
6. If you know that a conditional (and its antecedent) is true, use $\rightarrow$ Elim.
7. A contradiction is your friend. Spot it and use it.
8. To prove a negative, use $\neg$Intro.
9. Use unbreakable sentences to prove $\perp$.
10. Use the "logic for dummies" trick to handle $\neg(P \vee Q)$.
11. If you have an equation, use =Elim to make a substitution.
12. Try $\neg$Intro for any goal you have.
13. (Lucky for some.) Assume something that seems like it might help.
14. PANIC !!