Proof strategies

Week 4 . Deep dive.

ABCS

- Assumptions (write them down)

- Break down the assumptions
  - E ∧, E→, E↔
  - Sometimes E v (though this can be tricky to identify)

- Conclusion (what's the main connective?)
  - I~, I →, Iv, I∧

- Stuff in the middle (trial and error)
  - Start with non-hypothetical rules
  - Then try out hypothetical rules

Table 4-1 Proof Strategies

If the conclusion is a(n):	*Then do this:*
Atomic formula	If no other strategy is immediately apparent, hypothesize the negation of the conclusion for ~I. If this is successful, then the conclusion can be obtained after the ~I by ~E.
Negated formula	Hypothesize the conclusion without its negation sign for ~I. If a contradiction follows, the conclusion can be obtained by ~I.
Conjunction	Prove each of the conjuncts separately and then conjoin them with &I.
Disjunction	Sometimes (though not often) a disjunctive conclusion can be proved directly simply by proving one of its disjuncts and applying ∨I. Otherwise, hypothesize the negation of the conclusion and try ~I.
Conditional	Hypothesize its antecedent and derive its consequent by →I.
Biconditional	Use →I twice to prove the two conditionals needed to obtain the conclusion by ↔I.

How *for all x* puts it:

Working backward from what you want.

- What does working backwards from each connective involve? Which connective is easiest to work backwards from? Hardest?

Work forward from what you have.

- What does working forward from each connective involve? Which connective is easiest to work forward from? Hardest?

My tip: There are no magical unicorn people who ”just get proofs”! It’s a matter of practicing and recognizing patterns. Remember, there aren’t *that* many rules anyway.