# Logic Supplementary Slides

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## Some Hints on Constructing Proofs

Suppose we want to prove

S |- W

S set of wffs, W a wff.

- Look at the structure of W – table on slide 3.
- Look where W occurs in S - table on slide 4. Here W is sub-formula of Q.



| Principle connective of W | W is of the form | Inference rule to consider | Subgoals |
|---|---|---|---|
| $\rightarrow$ | $A \rightarrow B$ | $\rightarrow$I | Assume A Show B |
| $\wedge$ | $A \wedge B$ | $\wedge$ I | Show A and Show B |
| $\leftrightarrow$ | $A \leftrightarrow B$ | $\leftrightarrow$ I | Show A$\rightarrow$B and Show B$\rightarrow$A |
| $\vee$ | $A \vee B$ | $\vee$I or RAA | Show A or Show B<br>Assume $\neg$ (A $\vee$ B) Show inconsistency |
| $\neg$ | $\neg$ A | RAA | Assume A Show inconsistency |



| In S we have | Inference rule to consider | Subgoals |
|---|---|---|
| P$\rightarrow$W<br>P$\rightarrow$Q | $\rightarrow$E | Show P<br>Then apply $\rightarrow$E |
| W$\vee$P, P$\vee$W<br>Q$\vee$P, P$\vee$Q | $\vee$E | Show $\neg$P<br>Then apply $\vee$E |
| W$\wedge$P, P $\wedge$ W<br>Q$\wedge$P, P$\wedge$Q | $\wedge$E | ---- |
| P $\leftrightarrow$ W<br>P $\leftrightarrow$ Q | $\leftrightarrow$E | ---- |
| $\neg$W $\rightarrow$ P | RAA | ---- |

Desperate?
No Idea which inference Rule to Use?

Try RAA.

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