

## Logic Supplementary Slides

Fariba Sadri

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## Some Hints on Constructing Proofs

Suppose we want to prove

$S \vdash W$

$S$  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  $Q$ .

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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 $B$ Assume $\neg (A \vee B)$ Show inconsistency
$\neg$	$\neg A$	RAA	Assume $A$ Show inconsistency

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

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Desperate?  
No Idea which inference Rule to Use?

Try RAA.

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