

Homework on §3.5—assigned Mon 9/28 and due Wed 9/30

Construct a derivation for the following claim of entailment and, for each stage, tell (i) which gap you chose to work on, (ii) the proximate argument of the gap and the (basic) rules that could have been applied, and (iii) the rule you applied (if there is any that could be applied):

$$\neg (A \wedge \neg B) \wedge C, A \wedge D \vDash B \wedge D$$

The following worksheet is designed for this sort of exercise.

Procedure for the derivation worksheet

Enter any premises of the argument as initial assumptions, enter the conclusion as a goal, and follow the procedure below until you are done.

1. *Choose an open gap.* Find all the open gaps of the derivation. If there are none, the derivation is closed and you are done. If there is more than one, pick one to work on (it does not matter which).
2. *Identify its proximate argument.* Find the goal and the active resources of the gap you are working on; and, for each of these, identify the kind of sentence it is—that is, decide whether it is \top , \perp , a conjunction, a negation, or an atomic sentence.
3. *Check for closure.* Check whether the gap can be closed using one of the rules in the following table:

<i>rule</i>	<i>conditions for applying it</i>
QED	the goal is among the resources
Nc	the goal is \perp , and there are sentences ϕ and $\neg \phi$ among the resources
ENV	the goal is \top
EFQ	\perp is a resource

If the conditions for applying one of these rules are met, apply the rule, and start again at step 1.

4. *Choose a sentence to work on.* Find which, if any, of the goal and active resources has a rule that may be applied at this stage. That is, for each of these sentences check whether a basic rule (outlined in the table below) applies to a resource or goal of that sort and check whether any additional requirements are met.

<i>kind of sentence</i>	<i>exploitation rule</i>	<i>planning rule</i>
conjunction	Ext	Cnj
negated {	CR (when the goal is \perp)	RAA
non-atomic sent.	<i>none</i>	
atomic sentence		
atomic sentence	<i>none</i>	IP
\top or \perp	<i>none</i>	<i>none</i>

If there is no sentence to which a rule can be applied, you have reached a dead-end open gap; mark it as such and you are done. If there is more than one sentence to which a rule may be applied, pick one to work on (it does not matter which).

5. *Apply a rule.* Apply the rule you have identified to the sentence you have found, and start again at step 1.

