Logic for Philosophy
Study guide for exam 2

Like the midterm, the second exam will contain a mixture of homework-type problems (though none as hard as the hardest homework problems) and true/false or short-answer questions testing concepts. As before, I may ask you questions pertaining to the various metalogical proofs we covered, but I won't ask questions that require you to have memorized massive amounts of material. The exam will *not* be cumulative; it will be on the material we discussed after the midterm (i.e., chapters 6 and 8). Here are the main things to know:

1. Propositional modal logic: philosophical issues. Strengths of necessity and possibility. Possible worlds. Distinction between taking the semantics as "real live metaphysics" versus taking it as merely a piece of mathematics.

2. Propositional modal logic: grammar. Definition of wff. Defined symbols ($\Diamond$,$\strictif$).

3. Propositional modal logic: semantics. Definition of a model for the various systems. Establishing validity and invalidity: I give you a wff; you give me a semantic validity proof for each system in which it's valid, and a countermodel for each system in which it's invalid.

4. Propositional modal logic: proof theory. The different axiomatic systems. Axiomatic proofs of given formulas in those systems. Why necessitation is a strange rule, and why that doesn't matter if we only use the system to establish theoremhood.

5. Soundness and completeness of propositional modal logic. Have a reasonable grasp of the concepts involved in these proofs, and how the proofs themselves go. Here are some examples of questions I might ask:

   (a) Prove soundness for system X, assuming without proof the following theorems and lemmas [here I tell you what those theorems and lemmas are]

(b) Prove completeness for system X, assuming without proof the following theorems and lemmas [here I tell you what those theorems and lemmas are]

(c) Define 'maximal consistent set of wffs', and show that for every maximal consistent set of wffs Γ, exactly one of ϕ, $\sim\phi$ is a member of Γ.

(d) Explain what the following assertion means, and then prove it: 'Lemma 6.3: MP and NEC preserve validity in any given model'.

(e) Define 'canonical model for system X'

6. Counterfactuals: distinction between counterfactuals and other conditionals; logical behavior of English counterfactuals; context dependence of counterfactuals.

7. The Stalnaker-Lewis approach to counterfactuals: its basic idea; definition of model and valuation function; establishing validity and invalidity for particular formulas; how the system fits the logical behavior of natural language counterfactuals; Lewis's critique of Stalnaker's system.