Comp Sci 691M: Notes and First Problem Set Sept. 11, 1996

Notes and Comments: Today we introduced the notion of derivations, i.e., proofs, in propositional logic. These are natural deduction style proofs, due to Gentzen. We defined them inductively as syntactic objects, in a definition similar to the inductive definition of PROP. This makes it easy to prove many things about derivations, including the Soundness theorem: $\Gamma \vdash \varphi \;\Rightarrow\; \Gamma \models \varphi$. On Monday, we will complete the proof of the Completeness theorem: $\Gamma \vdash \varphi \;\Leftarrow\; \Gamma \models \varphi$ and, in fact, the whole section on propositional logic.

Reading: Please finish reading Chapter 1 of van Dalen by Monday, September 21. Good exercises to try are # 6, page 39, and # 2,3, and 9, page 46.

First Problem Set, Due Sept 25: Those of you who are taking the course for credit, please write up and hand in solutions to exercises 12, 13, 14, and 15, on pages 47 and 48 of van Dalen. All together this gives a proof of the propositional version of the Craig Interpolation Theorem. What I want is a clear write-up of a proof of this theorem. You can think of exercises 12, 13, and 14 as hints, i.e., you don't have to do it exactly this way. What I want is a clear proof, not excessive detail. As always, please feel free to talk with me or send email if you have any questions about these problems or any other aspect of the course.