

Prelim is in class on Tue Oct 16.

The prelim will be based on lecture notes posted on the course web page plus readings in Smullyan First-Order Logic, specifically Chapters I, II, III only §1, IV, V only §1,2. The exam will have: definitions and short answers; requests to provide evidence for IPC formulas, simple FOL formulas; possibly requests to find errors in purported evidence terms for IPC; requests to do proofs in Refinement Logic (but not in tableau); requests to explain the significance of concepts. Here are examples of the kinds of questions.

Define the concept of an atomic proposition, e.g. P, Q, R , or the concept of an atomic predicate. What is the evidence for $\exists x.P(x)$ assuming $P(x)$ is atomic?

Give evidence for such and such a proposition, for example,

$(\exists x.Q(x) \wedge \forall x.P(x)) \Rightarrow \exists x.P(x)$. Explain why there is no evidence for some propositions, e.g. $\neg(P \wedge Q) \Rightarrow \neg P \vee \neg Q$.

Provide a Refinement proof for the following formulas, e.g.

$$P \Rightarrow \neg\neg P, \quad \forall x(\neg P(x) \vee \exists x Q(x)) \Rightarrow \forall x(P(x) \Rightarrow \exists x Q(x)),$$

$$\exists x.\forall y.R(x,y) \Rightarrow \forall y.\exists x.R(x,y)$$

Discuss a question such as what is the added value of a constructive proof over a tableau proof? How can we explain

$((P \wedge Q) \Rightarrow R) \Rightarrow (P \Rightarrow (Q \Rightarrow R))$ as a programming problem.