

Problem assignment 5

Due: Thursday, October 22, 2009

Propositional Logic

Problem 1.

Let KB consists of the following sentences:

$$\begin{aligned} \neg(P \wedge \neg Q) \vee \neg(\neg S \wedge \neg T), \\ \neg(T \vee Q), \\ U \rightarrow (\neg T \rightarrow (\neg S \wedge P)). \end{aligned}$$

Prove that $\neg U$ holds using:

- **Part a.** Truth-table approach.
- **Part b.** Inference rule approach.

Problem 2

Assume the following set of facts:

If the unicorn is mythical, then it is immortal, but if it is not mythical, then it is a mortal mammal. If the unicorn is either immortal or a mammal, then it is horned. The unicorn is magical if it is horned.

Part a. Express the above knowledge in the propositional logic.

Part b. Can you prove that the unicorn is mythical? Give a proof if provable.

Part c. Can you prove the fact that the unicorn is magical? Give a proof if provable.

Part d. Can you prove the fact that the unicorn is horned? Give a proof if provable.