4CCS1ELA – Elementary Logic with Applications
Programming with Logic

Small Group Tutorial 5

Question 1

Transform ¬*(p → (¬q → s))* into conjunctive normal form, showing each step of reasoning and the rule number applied at each step (rules 1 to 7 in lecture 8 slide 15).

Question 2

Convert the following set of formulas to a program of definite rules:

1. ¬((P ∧ G) →¬M)
2. M → (P → (Q → R))
3. ¬(P ∧ G) ∨ Q

   Then given the program you obtained, show a successful derivation tree for the query **?R**.

Question 3

Transform ¬(∀x ∀yP(x, y) → ∃y(G(y) ∨ F (y))) into prenex normal form, showing every step in the transformation.

Question 4

a) Specify the following as a predicate definite clause program:

Anne will invite anyone who is friends with Bob. Anyone who plays golf with Bob and works with him is friends with Bob. Charlie plays golf with Bob and works with him.

b) Draw a derivation tree for the query ∃z invite (anne, z).