COMP21111 Assignment 7
20 marks

Deadline: 26th Nov., time 12:00, SSO

Show your working.

Problem 1 (8 marks)

Draw the parse tree for the following formula:

$$(\exists p(\forall r\ r \leftrightarrow p) \rightarrow q) \rightarrow (\forall q(\ r \rightarrow q) \wedge p).$$

i) Mark all bound occurrences of variables in this formula.
ii) Mark polarities of all subformula occurrences in this parse tree.

Problem 2 (9 marks)

Transform the following formula into prenex form:

$$\exists p\, \neg p \to \forall p\, (\neg p \vee q) \wedge (\forall p\, p \to \neg p)$$

Problem 3 (3 marks)

Consider propositional formulas (without quantifies) F_1 and F_2 over variables p, q, r. Write down a quantified Boolean formula G expressing the following:

F_1 is satisfiable and all models of F_1 are also models of F_2. (*)

In other words G is true if and only if (*) holds.