

Automated Reasoning: Exercise 2

This work forms part of the coursework assessment. The deadline is November 30, 2009, 4pm. Please submit your work to the Student Support Office, Room LF21 AND send your Prolog programs by email to Pavel Klinov. If you do not email programs to Pavel you will get no marks. If your program sent in the email is different from the one submitted to the SSO, you will get no marks too.

Attempt all of the following questions.

Question 1 Suppose that we have a predicate `greater` defining an ordering on atoms. Define in Prolog a predicate `lgreater` for literal comparison as in the lecture. Negative literals are represented using the unary function symbol `not`. For example `not(p)` represents the negation of `p`. Apparently, `lgreater` should be defined in terms of `greater`. (2 marks)

Question 2 Suppose that a clause is represented as a list of literals and literals are represented as in the previous question. Define in Prolog the `split` predicate for splitting a clause into maximal and non-maximal literals. (4 marks).

Question 3 Define in Prolog a predicate `factor(C1,C2)` so that it applies factoring rules to `C1` while possible obtaining `C2`. In other words, `factor(C1,C2)` removes all duplicate literals from `C1` obtaining `C2`. For example, `factor([p1,not(p2),not(p2),p1],C)` binds `C` to `[p1,not(p2)]`. Likewise, `factor([p2,p1],C)` binds `C` to `[p2,p1]` (5 marks)

Question 4 Using the `split` predicate, define in Prolog the predicate `resolve(C1,C2,C)` that applies ordered resolution to `C1` and `C2`. For example, `resolve([p1,p2],[not(p2)],C)` will bind `C` to `[p1]`, if `p2 > p1` (4 marks)