AUTOMATED REASONING (KB 2012) MAIN ASSESSED COURSEWORK Part 2

Issued: November 27th 2012
Due: December 11th
Marked scripts available (latest) by Dec. 14th

NOTE: variables begin with lower case u to z.

1. (2 marks)

Give *all* results of paramodulating (one step only) (i) into (ii):

(i) $x=a \vee x=b$ into (ii) $P(f(y)) \vee \neg Q(y)$

2(a) (**9 marks**)

Use resolution and paramodulation to derive the empty clause from (1) - (4).

(1)	$Q(e,e)$	(2)	$Q(x, y) \vee Q(y, x) \vee x=y$
(3)	$\neg Q(x, h(x))$	(4)	$h(h(z)) = z$

2(b) Use RUE to derive the empty clause from (1)-(4). You may also need to use x=x.

3. **(9 marks)** Apply the Knuth Bendix procedure to the following set of equations:

(29) $a(x,b) = x$ (30) $a(d(x,y),z) = c(x,a(y,z))$

where a, c, d and e are functors, x, y and z are variables.

(a) Choose an ordering that orders (30) from Left to Right. What is the outcome?

(b) Choose an ordering that orders (30) from Right to Left. What is the outcome?

In both (a) and (b) make sure you justify the chosen direction for the generated rules (including the ordering of equations (29) and (30)).