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(* mosml -P full test.sml

Example using first order logic theorem prover Hal presented in ML for the Working Programmer,
2nd edition by Lawrence C. Paulson, Cambridge University Press, 1996.

Computer Scientists need to think logically, after all computer programs follow logical rules.
Can you solve this logic problem?

Kyle, Stan, and Cartman were rounded up yesterday, because one of them was suspected of having
grabbed a few too many cookies from the cookie jar.

The three friends made the following statements under very intensive questioning:

Kyle: I'm innocent
Stan: I'm innocent
Cartman: Stan is the guilty one

If only one of these statements was true, who took the cookies?

Quiz at http://www.comp.gmu1.ac.uk 3 March 2003 *)

use "hal.sml";

val goal = Command.goal and by = Command.by and auto = Tac.depth;

val test = "(g(k) | g(s) | g(c)) & ~(g(k) & g(s)) & ~(g(k) & g(c)) & ~(g(s) & g(c)) & \
\ (t(k) | t(s) | t(c)) & ~(t(k) & t(s)) & ~(t(k) & t(c)) & ~(t(s) & t(c)) & \
\ (t(k) <-> ~g(k)) & (t(s) <-> ~g(s)) & (t(c) <-> g(s)) --> g(?x)";

(* goal test; by auto; quit(); *)

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