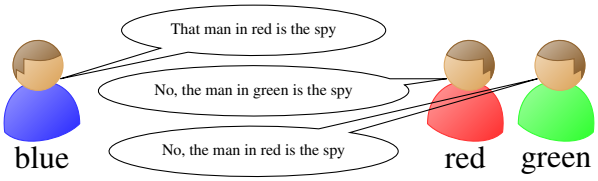
Puzzle 70. Who is the spy?

On the island of knights and knaves and spies, you come across three people. One wears blue, one wears red, and one wears green. You know that one is a knight, one is a knave, and one is a spy. "Who is the spy?" you ask. The man wearing blue says, "That man in red is the spy." The man wearing red says, "No, the man in green is the spy." The man wearing green says, "No, the man in red is in fact the spy." (taken from Popular mechanics - www.popularmechanics.com/science/math)



Listing 7.18: Finding models with spies

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assign(domain_size,3).
assign(max_models,-1).

formulas(island_of_truth_with_spies).
  all x (inhabitant(x) -> knight(x) | knave(x) | spy(x)).
  all x (knight(x) -> -knave(x) & -spy(x)).
  all x (knave(x)  -> -knight(x) & -spy(x)).
  all x (spy(x)    -> -knight(x) & -knave(x)).
  knight(x)        ->  m(x).          knave(x)  -> -m(x).
end_of_list.

formulas(puzzle).
  inhabitant(blue) & inhabitant(red) & inhabitant(green).
  blue = 0 & red = 1 & green = 2.
  (knight(x) & knight(y)) -> x=y.
  (knave(x)  & knave(y))  -> x=y.
  (spy(x)    & spy(y))    -> x=y.
  (exists x knight(x)) & (exists x knave(x)) & (exists x spy(x)).

  m(blue)  <-> spy(red).
  m(red)   <-> spy(green).
  m(green) <-> spy(red).
end_of_list.
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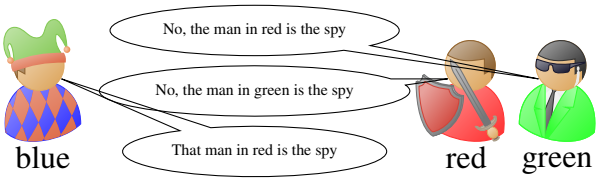

Figure 7.15: The single model found by Mace4