Consider the following problem

Three children ran in a race in their school sports day. Peter did better than the person who ran in red. Jack, wearing gold, did better than the child in green. Who won the race?

This problem can be solved easily using Prolog's unification and backtracking provided the structures to be used are chosen carefully.

First we must choose a representation for a child. We shall use the binary functor child with the two arguments being the child's name and shirt colour. So we would represent Jack in gold by

child(jack,gold)

The result for which we are searching is to be the order of the three children, so we shall represent that by a functor order with three arguments (which will be the children). Hence a possible result would be

order(child(jack,gold), child(peter,red), child(john,green))

Our aim is to get Prolog to instantiate a term of that type with an answer that is consistent with our clues.

A complete program would be

\[
\text{didbetter}(X, Y, \text{order}(X, Y, _)). \\
\text{didbetter}(X, Y, \text{order}(X, _, Y)). \\
\text{didbetter}(X, Y, \text{order}(_, X, Y)). \\
\text{clue1}(S) :- \text{didbetter}(\text{child}(\text{peter},_), \text{child}(_, \text{red}), S). \\
\text{clue2}(S) :- \text{didbetter}(\text{child}(\text{jack}, \text{gold}), \text{child}(_, \text{green}), S).
\]

and the program is then run by asking for an $S$ that satisfies all the clues

\[
?\text{-}\text{clue1}(S), \text{clue2}(S).
\]

\[
S = \text{order}(\text{child}(\text{jack}, \text{gold}), \text{child}(\text{peter}, \text{green}), \text{child}(_, \text{red}));
\]

no

Notice that all the work of fitting the child's names and colours into the appropriate places was all done by the unification mechanism of Prolog. Verify the above program by testing it on computer.
Now solve the following famous logic puzzle "Who owns the zebra?"

Consider the following facts about a street containing five houses, each of a different colour, each owned by a man of a different nationality, with a different drink, pet and sport:

- The Englishman lives in the red house.
- The Spaniard owns the dog.
- Coffee is drunk in the green house.
- The Ukrainian drinks tea.
- The green house is immediately to your right of the ivory house.
- The tennis player has per snails.
- Chess is played in the yellow house.
- Milk in drunk in the middle house.
- The Norwegian lives in the first house of the left.
- The man who plays rugby lives in the house next to the man with the fox.
- Chess is played in the house next to the house where the horse is kept.
- The volleyball player drinks orange juice.
- The Japanese man plays Go.
- The Norwegian lives next to the blue house.
- The person who drinks tea lives in the house next to the man who drinks milo.

Who owns the zebra?

What happens if the last fact is removed?

What happens if only the second last fact is removed?!

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