

Knowledge representation

Tutorial 5

25 October 2013

Correction of proposed exercises

1. Define a predicate `simplify(+Tr1,-Tr2)`, where `Tr1` and `Tr2` are full binary trees labeled by natural numbers, that succeeds if `Tr2` is the simplified version of `Tr1`. To simplify a tree, each node with two children leaves that have the same label is replaced by a leave with this label. At first, we will simplify only at one level of the tree, then, we will simplify recursively as long as the labels are equals.

2. Define a predicate `countdown(+Ns,+K,-Lo)` that succeeds if `Ns` is a list of natural numbers from where we can compute the number `K` with the list of arithmetic operations specified by `Lo`.

```
?- countdown([4, 75, 10, 7, 25, 1], 405, Lo).
```

```
Lo = [[7, +, 25, =, 32], [32, +, 1, =, 33],  
      [33, *, 10, =, 330], [330, +, 75, =, 405]]
```

Exercises

3. Three friends ranked first, second and third in a chess tournament. Each has a first name and a nationality different from the two others, practices a sport that the two others don't. Michel plays basket and comes ahead the American. Simon, the French man, ranks better than the tennis player. The rugby player finishes at the first place. Who is the Australian? Which is the sport of Richard?

Define a predicate to solve this enigma.

4. Define a predicate `partition(+Es, -Ls)`, where `Es` is a set of elements, represented by a list, and where `Ls` is a list, that succeeds if `Ls` is a partition of the set `Es`.

```
?- partition([a,b,c], X).  
X = [[a], [b], [c]] ;  
X = [[a], [b, c]] ;  
X = [[a, b], [c]] ;  
X = [[a, c], [b]] ;  
X = [[a, b, c]] ;  
false.
```

Proposed exercise

5.

Eight queens puzzle:

The eight queens puzzle is the problem of placing eight chess queens on an 8x8 chessboard so that no two queens attack each other.