Inteligência Artificial - Trabalho 2

Elementos

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Respostas

Pergunta 1

O nosso estado inicial consiste numa grelha com todas as posições livres que vão ser afetadas, e outra com todas as posições já preenchidas, que vão ser as não afetadas. Uma posição contém cinco variáveis, sendo duas delas as coordenadas X e Y, depois temos Q que indica o quadrante, V que é o valor que está nessa posição e o domínio de valores.

estado_inicial(e([
c(1,1,1,V, [1,2,3,4,5,6,7,8,9]),c(2,1,1,V, [1,2,3,4,5,6,7,8,9]), c(4,1,2,V, [1,2,3,4,5,6,7,8,9]),c(6,1,2,V, [1,2,3,4,5,6,7,8,9]),c(8,1,3,V, [1,2,3,4,5,6,7,8,9]),c(9,1,3,V, [1,2,3,4,5,6,7,8,9]),
c(2,2,1,V, [1,2,3,4,5,6,7,8,9]),c(3,2,1,V, [1,2,3,4,5,6,7,8,9]),c(5,2,2,V, [1,2,3,4,5,6,7,8,9]), c(7,2,3,V,

[1,2,3,4,5,6,7,8,9]),c(8,2,3,V, [1,2,3,4,5,6,7,8,9]),

c(3,3,1,V, [1,2,3,4,5,6,7,8,9]), c(4,3,2,V,

[1,2,3,4,5,6,7,8,9]),c(5,3,2,V),c(6,3,2,V, [1,2,3,4,5,6,7,8,9]), c(7,3,3,V,

[1,2,3,4,5,6,7,8,9]),

c(1,4,4,V, [1,2,3,4,5,6,7,8,9]),c(3,4,4,V,

[1,2,3,4,5,6,7,8,9]),c(5,4,5,V, [1,2,3,4,5,6,7,8,9]), c(7,4,6,V,

[1,2,3,4,5,6,7,8,9]),c(9,4,6,V, [1,2,3,4,5,6,7,8,9]),

c(1,5,4,V, [1,2,3,4,5,6,7,8,9]),c(2,5,4,V,

[1,2,3,4,5,6,7,8,9]), c(4,5,5,V, [1,2,3,4,5,6,7,8,9]),c(5,5,5,V,

[1,2,3,4,5,6,7,8,9]),c(6,5,5,V, [1,2,3,4,5,6,7,8,9]),c(8,5,6,V,

[1,2,3,4,5,6,7,8,9]),c(9,5,6,V, [1,2,3,4,5,6,7,8,9]),

c(1,6,4,V, [1,2,3,4,5,6,7,8,9]),c(3,6,4,V,

[1,2,3,4,5,6,7,8,9]), c(5,6,5,V, [1,2,3,4,5,6,7,8,9]), c(7,6,6,V,

[1,2,3,4,5,6,7,8,9]),c(9,6,6,V, [1,2,3,4,5,6,7,8,9]),

c(3,7,7,V, [1,2,3,4,5,6,7,8,9]), c(4,7,8,V,

[1,2,3,4,5,6,7,8,9]),c(5,7,8,V, [1,2,3,4,5,6,7,8,9]),c(6,7,8,V,

[1,2,3,4,5,6,7,8,9]), c(7,7,9,V, [1,2,3,4,5,6,7,8,9]),

c(2,8,7,V, [1,2,3,4,5,6,7,8,9]),c(3,8,7,V,

[1,2,3,4,5,6,7,8,9]),c(5,8,8,V, [1,2,3,4,5,6,7,8,9]), c(7,8,9,V,

[1,2,3,4,5,6,7,8,9]),c(8,8,9,V, [1,2,3,4,5,6,7,8,9]),

c(1,9,7,V, [1,2,3,4,5,6,7,8,9]),c(2,9,7,V,

[1,2,3,4,5,6,7,8,9]), c(4,9,8,V, [1,2,3,4,5,6,7,8,9]),c(6,9,8,V,

[1,2,3,4,5,6,7,8,9]), c(8,9,9,V, [1,2,3,4,5,6,7,8,9]),c(9,9,9,V,

[1,2,3,4,5,6,7,8,9])

], [

c(3,1,1,5, [1,2,3,4,5,6,7,8,9]),c(5,1,2,8,
[1,2,3,4,5,6,7,8,9]),c(7,1,3,7, [1,2,3,4,5,6,7,8,9]),c(1,2,1,7,
[1,2,3,4,5,6,7,8,9]),
c(4,2,2,2, [1,2,3,4,5,6,7,8,9]),c(6,2,2,4,
[1,2,3,4,5,6,7,8,9]),c(9,2,3,5, [1,2,3,4,5,6,7,8,9]),c(1,3,1,3,
[1,2,3,4,5,6,7,8,9]),
c(2,3,1,2, [1,2,3,4,5,6,7,8,9]),c(8,3,3,8,
[1,2,3,4,5,6,7,8,9]),c(9,3,3,4, [1,2,3,4,5,6,7,8,9]),c(2,4,4,6,
[1,2,3,4,5,6,7,8,9]),
c(4,4,5,1, [1,2,3,4,5,6,7,8,9]),c(6,4,5,5,
[1,2,3,4,5,6,7,8,9]),c(8,4,6,4, [1,2,3,4,5,6,7,8,9]),c(3,5,4,8,
[1,2,3,4,5,6,7,8,9]),
c(7,5,6,5, [1,2,3,4,5,6,7,8,9]),c(2,6,4,7,
[1,2,3,4,5,6,7,8,9]),c(4,6,5,8, [1,2,3,4,5,6,7,8,9]),c(6,6,5,3,
[1,2,3,4,5,6,7,8,9]),
c(8,6,6,1, [1,2,3,4,5,6,7,8,9]),c(1,7,7,4,
[1,2,3,4,5,6,7,8,9]),c(2,7,7,5, [1,2,3,4,5,6,7,8,9]),c(8,7,9,9,
[1,2,3,4,5,6,7,8,9]),
c(9,7,9,1, [1,2,3,4,5,6,7,8,9]),c(1,8,7,6,
[1,2,3,4,5,6,7,8,9]),c(4,8,8,5, [1,2,3,4,5,6,7,8,9]),c(6,8,8,8,
[1,2,3,4,5,6,7,8,9]),
c(9,8,9,7, [1,2,3,4,5,6,7,8,9]),c(3,9,7,3,
[1,2,3,4,5,6,7,8,9]),c(5,9,8,1, [1,2,3,4,5,6,7,8,9]),c(7,9,9,6,
[1,2,3,4,5,6,7,8,9])])).

Definimos uma restrição, que vê se um elemento ja está dentro de uma lista, e usámo-la para verificar as linhas, colunas e quadrantes.

Linhas:

```
differentL(e(_, [c(X,_,_,V1,_)|R])):-
    findall(V, member(c(X,_,_,V,_),R), R1),
    diff([V1|R1]).
```

Colunas:

```
differentC(e(_, [c(_,Y,_,V1,_)|R])) :-
    findall(V, member(c(_,Y,_,V,_),R),R1),
    diff([V1|R1]).
```

Quadrantes:

```
differentQ(e(_, [c(_,_,Q,V1,_)|R])):-
    findall(V, member(c(_,_,Q,V,_),R), R1),
    diff([V1|R1]).
```

Programas Usados

- `sudoku`: tem a estrutura base do programa, sendo que executa as restrçõese tem o estado inicial.
- `alg`: Onde está o chamamento e implemantação dos algoritmos de pesquisa.