Assignment 04 (Due: Monday, April $27, 2020, 11:59:00$PM (Central Time))

CSCE 322

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1 Instructions

This assignment will use Prolog to extract certain information about the state of a variation of Peg Solitaire.

1.1 Data File Specification

An example of properly formatted file is shown in Figure 1.

part01test01.eps

```
[r,d,u,r,l,l,l,d,l,u,r,r].
[2,-,x,x,x,x,x].
[x,x,-,x,-,x,x].
[x,3,x,-,x,-,x].
[x,-,4,x,x,x,x].
[x,x,-,x,x,-,x].
[x,x,x,1,-,x,x].
[x,x,x,x,x,x,x].
```

Figure 1: A properly formatted encoding

1.2 columnsAndRows(Game)

The query `columnsAndRows(Game)` will be successful when the number of columns in the `Game` and rows in the `Game` are both even or both odd.

```
game
[2,-,x,x,x,x,x]
[x,x,-,x,-,x,x]
[x,3,x,-,x,-,x]
[x,-,4,x,x,x,x]
[x,x,-,x,x,-,x]
[x,x,x,1,-,x,x]
[x,x,x,x,x,x,x]
true
```

1.3 openSpaces(Game)

The query `openSpaces(Game)` will be successful when no more than 33% of the spaces in the `Game` are without a peg.

```
game
[-,-,x,x,x,x,x,-]
[x,x,x,x,x,x,x,x]
[x,x,x,x,x,2,-,x]
[x,x,-,x,x,1,x,x]
[x,x,x,x,x,x,x,x]
[-,x,x,x,x,x,x,-]
true
```

1.4 fewestMoves(Game,Moves)

The query `fewestMoves(Game,Moves)` will be successful when `Moves` is unified with the shortest sequence of moves (directions to move) that can be made to win the `Game` for Player `1` (have only one peg in the `Game`). No other players will make moves in the initial `Game`.

```
game
[-,-,-,-,-,-,-]
[x,-,-,-,-,-,-]
[-,-,-,-,-,-,-]
[-,-,-,1,-,-,-]
[-,-,-,-,-,-,-]
[-,-,-,-,-,-,-]
[-,-,-,-,-,-,-]
moves
[]
true
```

1.5 noIslands(Game) (15% **Extra Credit**)

The query `noIslands(Game)` will be successful when the `Game` contains at least one player space that a peg can be moved into.

```
game
[-,-,-,-,-,-]
[-,-,-,-,-,-]
[-,-,-,1,-,-]
[-,-,-,-,-,-]
[-,-,-,-,-,-]
[-,-,-,-,-,-]
[-,-,-,-,-,-]
false
```

2 Compilation & Execution

Your program will be tested on `cse.unl.edu`, using `pl`. `a04tests.pl` will include test cases for testing your program. You can run the test cases with the commands:

```
[a04tests].
loadHelpers.
part01.
```

3 Webgrader Warning

Prolog programs can take some time to run. The webgrader is limiting individual processes to 5 minutes.

4 Naming Conventions

You will be submitting at least 4 `.pl` files. The filenames should be `csce322a04part01.pl`, `csce322a04part02.pl`, `csce322a04part03.pl`, and, maybe `csce322a04part04.pl`. If you do not submit a version of `helpers.pl`, the default file will be provided for your program.

5 Point Allocation

Component	Points
csce322a04part01.pl	30
csce322a04part02.pl	30
csce322a04part03.pl	40
Total	100

6 External Resources

Prolog - Wikibooks
Learn Prolog Now!
Prolog Tutorial Category:Prolog - Rosetta Code