

How to run:

- 0) Use 'cd' to navigate to the working directory (where files live)
- 1) run wumpus.pl using "swipl wumpus.pl" command.
- 2) After that, you should write "start(L)." command. L is list of all solutions which will be printed in pyinput.txt.
- 3) Close the program with "halt." command.
- 4) Run a python script ("python script.py") or ("python3 script.py") which will remove all duplicates and then sort all solutions by length in ascending order.
- 5) Congratulations! You have all possible solutions in pyoutput.txt file.

P.S. You can choose map which agent should play on. Just by uncomment map which you like and comment another.

How It works

Base:

There is a hero which starts from (1,1) point and then try to find gold and not to die. It can be killed by either Wumpus or a pit. Hero can go in one of four directions (up, right, down, left). There is a breeze near all pits and stench near wumpus. There can be as many pits as you want but only one wumpus.

How algorithm works:

Algorithm tries to go in all four(up, right, down, left) direction. If there is stench near it also tries to kill wumpus by shooting an arrow in direction hero is going to go.

I use 2 variables to control how good an agent.

First is Count. It is number of cells agent have traversed.

Second in Points. How much costs his actions which are different from moves.

Shooting an arrow is an example of such action.

When hero found the gold it wins.

After gold is found algorithm writes actions agent have made during goldfinding. And its score. Score is Count + Points.

Examples

First example when you need to kill wumpus in order to get gold.

G - gold
W - wumpus
P - pit
S - start
% - wall
* - empty space

```
% This is the 1st map
```

```
%%%%%%%%%%  
%*  *  *  *  *%  
%*  *  *  *  *%  
%*  *  G  *  *%  
%P P  *  *  *%  
%S W  *  *  *%  
%%%%%%%%%
```

```
wumpus((1,2)).  
gold((3,3)).  
pit((2,1)).  
pit((2,2)).
```

```
0) right+shoot right up up, Score = 14  
1) right+shoot right right up left up, Score = 16  
2) right+shoot right right up up left, Score = 16  
3) right+shoot right up right up left, Score = 16  
4) right+shoot right right up up up left down, Score = 18  
5) right+shoot right up right up up left down, Score = 18  
6) right+shoot right right right up left left up, Score = 18  
7) right+shoot right up right right up left left, Score = 18  
8) right+shoot right right right up up left left, Score = 18  
9) right+shoot right right up right up left left, Score = 18
```

```
493) right+shoot right right right up up left up right up left left down left up left down down right right, Score = 30  
494) right+shoot right up right right up up up left left left left down down right up right right down left, Score = 30  
495) right+shoot right right up right up left up right up left left down left up left down down right right, Score = 30  
496) right+shoot right right right up left up right up up left down left left up left down down right right, Score = 30  
497) right+shoot right up right down right up up left up right up left left left left down right right down, Score = 30  
498) right+shoot right right right up up up left left left left down down right up right right down left, Score = 30  
499) right+shoot right right up right up left up right up left left left left down down right up right down, Score = 30  
500) right+shoot right up right right up left up right up left left left left down down right up right down, Score = 30  
501) right+shoot right right right up left up right up up left left down left up left down down right right, Score = 30  
502) right+shoot right right right up left up right up left up left down left up left down down right right, Score = 30  
503) right+shoot right right right up left up up right up left left left left down down right up right down, Score = 30  
504) right+shoot right right up right up up up left left left left down down right up right right down left, Score = 30  
505) right+shoot right up right down right up up left up right up left left left left down down right right, Score = 30  
506) right+shoot right up right down right up up up up left left left left down right right right down left, Score = 30  
507) right+shoot right up right down right up up left up right up left left left down left down right right, Score = 30  
508) right+shoot right right right up left up right up up left down left up left left down right down right, Score = 30  
509) right+shoot right right right up left up right up up left down left up left down left down right right, Score = 30  
510) right+shoot right right right up left up up right up left left down left up left down down right right, Score = 30  
511) right+shoot right up right down right up up left up right up left left down left left down right right, Score = 30  
512) right+shoot right up right down right up up left up right up left left left left down right down right, Score = 30  
513) right+shoot right right right up up up up left left left left down down right up right right down down left up, Score = 32  
514) right+shoot right up right down right up up up up left left left left down down right up right right down left, Score = 32  
515) right+shoot right up right down right up up left up right up left left down left up left down down right right, Score = 32  
516) right+shoot right up right down right up up left up right up left left left left down down right up right down, Score = 32
```

Second example:

Here only 2 possible ways:
agent can either kill wumpus or not

Just 2 solutions:

```
0) up up right+shoot right down down, Score = 16  
1) up up up up right right down down down down, Score = 10
```

% This is the 2nd map

```
%%%%%%%%%%  
%*  *  *  P  *%  
%*  P  *  P  *%  
%*  W  *  P  *%  
%*  P  *  P  *%  
%S  P  G  P  *%  
%%%%%%%%%
```

```
wumpus((3,2)).  
gold((1,3)).  
pit((1,2)).  
pit((2,2)).  
pit((2,2)).  
pit((4,2)).  
pit((1,4)).  
pit((2,4)).  
pit((3,4)).  
pit((4,4)).  
pit((5,4)).
```

Third example:

This is impossible board.
It is not possible to get to the gold
because it is protected by pits.

Solutions:

```
No Solutions
```

% This is the 3rd map

```
%%%%%%%%%%  
%*  *  *  *  *%  
%*  *  *  *  *%  
%*  *  *  *  *%  
%*  *  W  P  *%  
%S  *  P  G  P%  
%%%%%%%%%
```

```
wumpus((2,3)).  
gold((1,4)).  
pit((1,3)).  
pit((1,5)).  
pit((2,4)).
```

```
%*****
```


Fourth and last example

Where gold is (5,5) with
random pits and wumpus.

```
% This is the 4th map
%%%%%%%%%
%*  * W * G%
%*  * * * *%
%* P * * *%
%* * * P *%
%S * * * *%
%%%%%%%%%

wumpus((5,3)).
gold((5,5)).
pit((3,1)).
pit((2,4)).
pit((5,3)).
```

Few Best:

```
0) up up right up right right up right, Score = 8
1) up up right up right right right up, Score = 8
2) up up right right right up right up, Score = 8
3) up up right right right right up up, Score = 8
4) right right up up up right right up, Score = 8
5) up up right right right up up right, Score = 8
6) up right up up right right right up, Score = 8
7) right up up right right up up right, Score = 8
8) up right right up up right right up, Score = 8
9) up right right up right up right up, Score = 8
10) up right right up up right up right, Score = 8
11) up up up right right right right up, Score = 8
12) right up up up right right right up, Score = 8
13) up right right up right right up up, Score = 8
```

Few Worst:

```
1564) up up right down down right right right up up left left up left left up right right+shoot right down right up, Score = 32
1565) up right down right right right up up up left down left up left down left up up right right+shoot right right, Score = 32
1566) up right right down right right up up left left up left down left up up right right+shoot right down right up, Score = 32
1567) up right down right right right up up left left up left down left up up right right+shoot right down right up, Score = 32
1568) up up right down down right right right up up up left down left up left left up right right+shoot right right, Score = 32
1569) right up right down right right up up up left down left up left down left up up right right+shoot right right, Score = 32
1570) right right right right up up up left down left up left down down left up up up right right+shoot right right, Score = 32
1571) right right right right up up left left up left down down left up up up right right+shoot right down right up, Score = 32
1572) right up right down right right up up left left up left down left up up right right+shoot right down right up, Score = 32
1573) up up right down right down right right up up left left up left left up right right+shoot right down right up, Score = 32
1574) up right right down right right up up up left down left up left down left up up right right+shoot right right, Score = 32
1575) right right right right up up up left down left down left left up right up left up right right+shoot right right, Score = 32
1576) right right right right up up up left left down down left left up right up left up right right+shoot right right, Score = 32
1577) right right right right up up left left down left left up right up left up right right+shoot down right right up, Score = 32
1578) right up left up right right down down right right up up up left left left left up right right+shoot right right, Score = 32
1579) right right right right up up left up left left down right down left left up up up right right+shoot right right, Score = 32
1580) right right right right up up left left down left left up right up left up right right+shoot down right up right, Score = 32
1581) right right right right up up left up left down down left left up right up left up right right+shoot right right, Score = 32
1582) right up left up right right down down right right up up left up left left left up right right+shoot right right, Score = 32
1583) up up right right down left down right right right up up left up left left left up right right+shoot right right, Score = 32
1584) right right right right up up left left down left left up right up left up right right+shoot right down right up, Score = 32
1585) right right right right up up up left left left down right down left left up up up right right+shoot right right, Score = 32
1586) up up right right down left down right right right up up up left left left left up right right+shoot right right, Score = 32
```