Name : Cindy Aprilia
Matricole number : 286702

PANCAKE PUZZLE AND CONGKLAK GAME

Library used : re, copy, abc, random, time, datetime, importlib.abc, os, csv

Inspired by :

> 1. Congklak-MinMax by lukaskurnia
> 2. pancakeSearch by d-heck

What is pancake sorting puzzle?

Pancake sorting is the mathematical problem of sorting pancakes in order for a spatula to be inserted at any position in the stack and used to flip all pancakes above. The least amount of flips necessary to neatly arrange the pancakes is called the pancake number.
Watch the visualization in here :

> - https://www.youtube.com/watch?v=kk-_DDgoXfk
> - https://www.youtube.com/watch?v=ChMjvN1eAFI

What is congklak?

Congklak is Indonesian game which playing board is made from wood with either 5, 6, 7 or 9 holes in both sides (The varies number of hole is due to variations from island to island), plus 2 homebases (1 for each player). There are 2 players on this game, which compete to get as many shells as possible in their homebase. In order to win, the player either need to have the most shells in his/her homebase (menang biji) or to be the last person to run out of shells on your side of the board (menang jalan).
For further instruction on how to play the game, please refer to :

> https://www.expat.or.id/info/congklakinstructions.html

Watch the visualization in here :

> https://www.youtube.com/watch?v=pxT4BbsdybY

The import use 2 non UDF library : copy and re
And then it calls 2 UDF AgentPancake and AgentCongklak to play the Pancake puzzle and Congklak game respectively

```
In [1]: import copy # Used for deep copy
        import re # for checking input
        from AgentPancake import PancakeCalling
        from AgentCongklak import CongklakApp
```

The game will ask user whether it want to shown the representation of pancake or puzzle.

User need to choose number 1 to start pancake puzzle. The code uses by this program capables to :

1. randomly generate the position of starting puzzle or get the input from the user.

The example below and statistic use randomly shuffles position for easier testing multiple times, but it can easily changed in main.py .

2. choose whether to call of the algorithm at once or just one of it.The example below and statistic calls all algorithm at once per sample, in order to compare the result.

3. The number of pancake to be play at least 4 pancakes, and the maximum is 9.

But, I only ever test until 6 due to the performance limitation of the laptop

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User can choose number 2 to play the 2-player congklak game :

1. User can change the level of how hard the game is.

2. The code is capable to accomodate human player vs min-max or random bot.

But, this testing purpose only let min-max bot competes with random bot or two min-max bot compete with each other, for easier and more statistically often.

3. The objective of this player is to compare how good min-max than randomly move agent without heuristic. The second objective in second turn-in is check the performance of min-max competes with each others.

4. So, the statistic will be counting how many times min-max win, lose, or tie when compete with random player. And the performance time, of min-max vs min-max

5. The congklak game is 2-player game, can not be one-player or multi-player because it is the rule in the real world.

So, the heuristic of this game regulate and limit the searching agent to be used by 2-player only for this game. But, on the highest level of abstraction, it is not limited.

To stop the game, user need to click on other keys than 1 or 2 in the questionnaire

```python
playing = True
while (playing==True) :
    choose1 = input("\n\n\n\n\nHai.. What do you want to do? (1/2/Other_keys) \n1. 1 agent puzzl

    if (str(choose1) == "1") :
        pancakeCalling = PancakeCalling("RANDOM", 'm', 4, True, False, False)
        pancakeCalling = PancakeCalling("RANDOM", 'm', 5, True, False, False)
    elif (str(choose1) == "2") :
        choose2 = input("How hard do you want the game to be? 1(Hard)-6(Easy) : ")
        choose3 = (str)(input("What game do you want to play? (MvM) MinMax vs MinMax or (MvR) Mir

        if ((choose3 == "MvR") or (choose3 == "MvM")):
            if (choose3 == "MvR"):
                choose4 = (int)(input("Who is the first player?\nPlayer with Random move (0) or I
            else :
                choose4 = 0
            app = CongklakApp(choose3, choose2, choose4, True, False) #mode, difficulity, player
        else:
            print("Incorrect input. Please retry...")
    else :
        playing = False
        print("Bye..Bye...")
```

```
SUCCESSFULLY RANDOMED INPUT WITH DEEP FIRST SEARCH : d2431
Starting Stack: 2 4 3 1
Depth First Search Solution:
24|31 g=0, h=4
|2413 g=2, h=4
3|142 g=6, h=4
32|41 g=9, h=4
|3214 g=11, h=4
4|123 g=15, h=3
Final State: 4321 g=18, h=0
Time : 0.0

SUCCESSFULLY RANDOMED INPUT WITH UNINFORMED SEARCH : u2431
Starting Stack: 2 4 3 1
Uniform Cost Search Solution:
2|431 g=0, h=4
|2134 g=3, h=4
43|12 g=7, h=2
Final State: 4321 g=9, h=0
Time : 0.007948

SUCCESSFULLY RANDOMED INPUT WITH GREEDY SEARCH : g2431
Starting Stack: 2 4 3 1
Greedy Search Solution:
2|431 g=0, h=4
|2134 g=3, h=4
43|12 g=7, h=2
Final State: 4321 g=9, h=0
Time : 0.001005

SUCCESSFULLY RANDOMED INPUT WITH ASTAR SEARCH : a2431
Starting Stack: 2 4 3 1
A* Search Solution:
2|431 g=0, h=4
|2134 g=3, h=4
43|12 g=7, h=2
Final State: 4321 g=9, h=0
Time : 0.003006

SUCCESSFULLY RANDOMED INPUT WITH DEEP FIRST SEARCH : d43512
Starting Stack: 4 3 5 1 2
Depth First Search Solution:
43|512 g=0, h=5
|43215 g=3, h=5
5|1234 g=8, h=4
Final State: 54321 g=12, h=0
Time : 0.0

SUCCESSFULLY RANDOMED INPUT WITH UNINFORMED SEARCH : u43512
Starting Stack: 4 3 5 1 2
Uniform Cost Search Solution:
43|512 g=0, h=5
|43215 g=3, h=5
5|1234 g=8, h=4
Final State: 54321 g=12, h=0
Time : 0.004099

SUCCESSFULLY RANDOMED INPUT WITH GREEDY SEARCH : g43512
Starting Stack: 4 3 5 1 2
Greedy Search Solution:
43|512 g=0, h=5
|43215 g=3, h=5
```

```
5|1234 g=8, h=4
Final State: 54321 g=12, h=0
Time : 0.0

SUCCESSFULLY RANDOMED INPUT WITH ASTAR SEARCH : a43512
Starting Stack: 4 3 5 1 2
A* Search Solution:
43|512 g=0, h=5
|43215 g=3, h=5
5|1234 g=8, h=4
Final State: 54321 g=12, h=0
Time : 0.001971
```

```
Bot MinMax 2 Turn
MvM 0
2022-11-21 21:44:35.499182Player 1 move: 3
Bot MinMax 1 Turn
2022-11-21 21:44:35.499182Player 2 move: 14
Bot MinMax 2 Turn
2022-11-21 21:44:35.499182Player 1 move: 1
Bot MinMax 1 Turn
2022-11-21 21:44:35.499182Player 2 move: 13
Bot MinMax 1 Turn
2022-11-21 21:44:35.499182Player 2 move: 8
Bot MinMax 2 Turn
2022-11-21 21:44:35.499182Player 1 move: 0
Bot MinMax 1 Turn
2022-11-21 21:44:35.499182Player 2 move: 11
Bot MinMax 1 Turn
2022-11-21 21:44:35.500182Player 2 move: 12
Bot MinMax 1 Turn
2022-11-21 21:44:35.501180Player 2 move: 11
Bot MinMax 2 Turn
2022-11-21 21:44:35.501180Player 1 move: 1
Bot MinMax 1 Turn
2022-11-21 21:44:35.502183Player 2 move: 9
Bot MinMax 1 Turn
2022-11-21 21:44:35.503199Player 2 move: 12
Bot MinMax 1 Turn
2022-11-21 21:44:35.504107Player 2 move: 13
Bot MinMax 1 Turn
2022-11-21 21:44:35.505104Player 2 move: 14
Bot MinMax 1 Turn
2022-11-21 21:44:35.506107Player 2 move: 13
Bot MinMax 1 Turn
2022-11-21 21:44:35.506107Player 2 move: 14
Bot MinMax 1 Turn
2022-11-21 21:44:35.507107Player 2 move: 11
Bot MinMax 1 Turn
2022-11-21 21:44:35.507107Player 2 move: 14
Bot MinMax 1 Turn
2022-11-21 21:44:35.508106Player 2 move: 12
Bot MinMax 1 Turn
2022-11-21 21:44:35.508106Player 2 move: 10
Bot MinMax 2 Turn
2022-11-21 21:44:35.509183Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.509183Player 1 move: 4
Bot MinMax 2 Turn
2022-11-21 21:44:35.510102Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.510102Player 1 move: 5
Bot MinMax 2 Turn
2022-11-21 21:44:35.510102Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.511105Player 1 move: 2
Bot MinMax 2 Turn
2022-11-21 21:44:35.511105Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.512106Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.512830Player 1 move: 4
Bot MinMax 2 Turn
2022-11-21 21:44:35.512830Player 1 move: 6
Bot MinMax 2 Turn
```

```
2022-11-21 21:44:35.514239Player 1 move: 5
Bot MinMax 2 Turn
2022-11-21 21:44:35.514239Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.514239Player 1 move: 1
Bot MinMax 1 Turn
2022-11-21 21:44:35.515249Player 2 move: 12
Bot MinMax 1 Turn
2022-11-21 21:44:35.515249Player 2 move: 11
Bot MinMax 2 Turn
2022-11-21 21:44:35.515249Player 1 move: 3
Bot MinMax 2 Turn
2022-11-21 21:44:35.516157Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.516157Player 1 move: 2
Bot MinMax 2 Turn
2022-11-21 21:44:35.516157Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.517254Player 1 move: 4
Bot MinMax 2 Turn
2022-11-21 21:44:35.517254Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.517254Player 1 move: 5
Bot MinMax 1 Turn
2022-11-21 21:44:35.517254Player 2 move: 14
Bot MinMax 2 Turn
2022-11-21 21:44:35.518229Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.518229Player 1 move: 4
Bot MinMax 2 Turn
2022-11-21 21:44:35.518229Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.519233Player 1 move: 2
Bot MinMax 1 Turn
2022-11-21 21:44:35.519233Player 2 move: 13
Bot MinMax 1 Turn
2022-11-21 21:44:35.519233Player 2 move: 12
Bot MinMax 2 Turn
2022-11-21 21:44:35.519233Player 1 move: 3
Bot MinMax 1 Turn
2022-11-21 21:44:35.519233Player 2 move: 14
Bot MinMax 1 Turn
2022-11-21 21:44:35.520234Player 2 move: 9
Bot MinMax 1 Turn
2022-11-21 21:44:35.520234Player 2 move: 11
Bot MinMax 2 Turn
2022-11-21 21:44:35.520234Player 1 move: 4
Bot MinMax 1 Turn
2022-11-21 21:44:35.520234Player 2 move: 13
Bot MinMax 2 Turn
2022-11-21 21:44:35.520234Player 1 move: 5
Bot MinMax 1 Turn
2022-11-21 21:44:35.520234Player 2 move: 14
Bot MinMax 1 Turn
2022-11-21 21:44:35.520234Player 1 move: 3
Bot MinMax 1 Turn
2022-11-21 21:44:35.521235Player 1 move: 4
Bot MinMax 1 Turn
2022-11-21 21:44:35.521235Player 1 move: 2
Bot MinMax 1 Turn
2022-11-21 21:44:35.521235Player 1 move: 3
Bot MinMax 1 Turn
```

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2022-11-21 21:44:35.521235Player 1 move: 1
Bot MinMax 1 Turn
2022-11-21 21:44:35.521235Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.521235Player 1 move: 5
Bot MinMax 1 Turn
2022-11-21 21:44:35.521235Player 1 move: 4
Bot MinMax 1 Turn
2022-11-21 21:44:35.521235Player 1 move: 3
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 2
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.522235Player 1 move: 5
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 4
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 3
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.522235Player 1 move: 5
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 4
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 6
Bot MinMax 2 Turn
2022-11-21 21:44:35.522235Player 1 move: 5
Bot MinMax 1 Turn
2022-11-21 21:44:35.522235Player 1 move: 6
Bot MinMax 2 Turn
Minimax Bot 1 WINS IN : 0.023053 SECONDS
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                              Bot Minimax Turn
                              MvR 0
2022-11-21 21:44:42.702101Player 1 move: 0
                              Bot Minimax Turn
2022-11-21 21:44:42.703099Player 1 move: 1
                              Bot Minimax Turn
2022-11-21 21:44:42.704099Player 1 move: 6
                              Bot Minimax Turn
2022-11-21 21:44:42.705099Player 1 move: 6
                              Bot Minimax Turn
2022-11-21 21:44:42.705099Player 1 move: 0
                              Bot Minimax Turn
2022-11-21 21:44:42.706101Player 1 move: 2
                              Bot Minimax Turn
2022-11-21 21:44:42.707101Player 1 move: 0
                              Bot Minimax Turn
2022-11-21 21:44:42.708106Player 1 move: 2
                              Bot Minimax Turn
2022-11-21 21:44:42.709111Player 1 move: 0
                              Bot Minimax Turn
2022-11-21 21:44:42.710099Player 1 move: 4
                              Bot Minimax Turn
2022-11-21 21:44:42.711100Player 1 move: 1
                              Bot Minimax Turn
2022-11-21 21:44:42.711100Player 1 move: 4
                              Bot Minimax Turn
2022-11-21 21:44:42.712174Player 1 move: 6
                              Bot Minimax Turn
2022-11-21 21:44:42.713211Player 1 move: 3
                              Bot Minimax Turn
2022-11-21 21:44:42.713211Player 1 move: 6
                              Bot Minimax Turn
2022-11-21 21:44:42.714207Player 1 move: 2
                              Bot Minimax Turn
2022-11-21 21:44:42.714207Player 1 move: 6
                              Bot Minimax Turn
2022-11-21 21:44:42.715212Player 1 move: 4
                              Bot Minimax Turn
2022-11-21 21:44:42.715212Player 1 move: 3
                              Bot Random Turn
2022-11-21 21:44:42.715212Player 2 move: 12
                              Bot Minimax Turn
2022-11-21 21:44:42.716207Player 1 move: 6
                              Bot Minimax Turn
2022-11-21 21:44:42.716207Player 1 move: 4
                              Bot Minimax Turn
2022-11-21 21:44:42.716207Player 1 move: 2
                              Bot Random Turn
2022-11-21 21:44:42.716207Player 2 move: 11
                              Bot Random Turn
2022-11-21 21:44:42.716207Player 2 move: 11
                              Bot Minimax Turn
2022-11-21 21:44:42.717206Player 1 move: 1
                              Bot Minimax Turn
2022-11-21 21:44:42.717206Player 1 move: 0
                              Bot Random Turn
2022-11-21 21:44:42.717206Player 2 move: 12
                              Bot Minimax Turn
2022-11-21 21:44:42.717206Player 1 move: 4
                              Bot Minimax Turn
2022-11-21 21:44:42.718206Player 1 move: 1
                              Bot Minimax Turn
```

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2022-11-21 21:44:42.718206Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:42.718206Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 1
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 3
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 2 move: 13
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 2 move: 14
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 0
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 1
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.719206Player 1 move: 2
Bot Random Turn
2022-11-21 21:44:42.719206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 3
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 14
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 14
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 6
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 14
Bot Random Turn
```

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2022-11-21 21:44:42.720206Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 13
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 0
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 1
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 2
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 3
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:42.720206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 1 move: 6
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.720206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 9
Bot Minimax Turn
```

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2022-11-21 21:44:42.721206Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:42.721206Player 2 move: 14
Bot Random Turn
Minimax Bot WINS IN : 0.021104 SECONDS
```

```
Bot Random Turn
MvR 1
2022-11-21 21:44:52.035441Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:52.037520Player 1 move: 6
Bot Minimax Turn
2022-11-21 21:44:52.038544Player 1 move: 3
Bot Minimax Turn
2022-11-21 21:44:52.039527Player 1 move: 2
Bot Random Turn
2022-11-21 21:44:52.039527Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:52.040438Player 1 move: 5
Bot Minimax Turn
2022-11-21 21:44:52.040438Player 1 move: 6
Bot Random Turn
2022-11-21 21:44:52.040438Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:52.041441Player 1 move: 6
Bot Minimax Turn
2022-11-21 21:44:52.042439Player 1 move: 3
Bot Minimax Turn
2022-11-21 21:44:52.042439Player 1 move: 2
Bot Random Turn
2022-11-21 21:44:52.042439Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:52.042439Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:52.042439Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:52.044095Player 1 move: 1
Bot Random Turn
2022-11-21 21:44:52.044095Player 2 move: 14
Bot Minimax Turn
2022-11-21 21:44:52.044095Player 1 move: 2
Bot Random Turn
2022-11-21 21:44:52.044095Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.044095Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:52.044095Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.045118Player 1 move: 4
Bot Minimax Turn
2022-11-21 21:44:52.045118Player 1 move: 6
Bot Minimax Turn
2022-11-21 21:44:52.045118Player 1 move: 1
Bot Random Turn
2022-11-21 21:44:52.045118Player 2 move: 14
Bot Minimax Turn
2022-11-21 21:44:52.046128Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:52.046128Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.046128Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:52.046128Player 2 move: 14
Bot Minimax Turn
2022-11-21 21:44:52.046128Player 1 move: 2
Bot Random Turn
2022-11-21 21:44:52.046128Player 2 move: 8
Bot Minimax Turn
```

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2022-11-21 21:44:52.046128Player 1 move: 3
Bot Random Turn
2022-11-21 21:44:52.046128Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:52.046128Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:52.046128Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:52.047109Player 1 move: 0
Bot Random Turn
2022-11-21 21:44:52.047109Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:52.047109Player 1 move: 6
Bot Minimax Turn
2022-11-21 21:44:52.047109Player 1 move: 2
Bot Minimax Turn
2022-11-21 21:44:52.047109Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:52.047109Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:52.047109Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:52.047109Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:52.047109Player 1 move: 1
Bot Random Turn
2022-11-21 21:44:52.047109Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.048197Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:52.048197Player 2 move: 14
Bot Random Turn
2022-11-21 21:44:52.048197Player 2 move: 10
Bot Minimax Turn
2022-11-21 21:44:52.048197Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:52.048197Player 2 move: 12
Bot Random Turn
2022-11-21 21:44:52.048197Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.048197Player 1 move: 3
Bot Random Turn
2022-11-21 21:44:52.048197Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.048197Player 1 move: 4
Bot Random Turn
2022-11-21 21:44:52.048197Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.049195Player 1 move: 1
Bot Random Turn
2022-11-21 21:44:52.049195Player 2 move: 14
Bot Random Turn
2022-11-21 21:44:52.049195Player 2 move: 12
Bot Minimax Turn
2022-11-21 21:44:52.049195Player 1 move: 5
Bot Random Turn
2022-11-21 21:44:52.049195Player 2 move: 12
Bot Minimax Turn
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Bot Random Turn
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Bot Minimax Turn
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Bot Random Turn
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Bot Minimax Turn
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Bot Minimax Turn
2022-11-21 21:44:52.049195Player 1 move: 0
Bot Random Turn
2022-11-21 21:44:52.049195Player 2 move: 9
Bot Minimax Turn
2022-11-21 21:44:52.049195Player 1 move: 2
Bot Random Turn
2022-11-21 21:44:52.049195Player 2 move: 13
Bot Minimax Turn
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Bot Random Turn
2022-11-21 21:44:52.050110Player 2 move: 13
Bot Minimax Turn
2022-11-21 21:44:52.050110Player 1 move: 4
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Bot Minimax Turn
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Bot Minimax Turn
2022-11-21 21:44:52.050110Player 1 move: 1
Bot Random Turn
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Bot Random Turn
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Bot Minimax Turn
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Bot Minimax Turn
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Bot Minimax Turn
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Bot Minimax Turn
2022-11-21 21:44:52.053191Player 2 move: 13
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Bot Minimax Turn
2022-11-21 21:44:52.053191Player 2 move: 8
Bot Minimax Turn
2022-11-21 21:44:52.053191Player 2 move: 11
Bot Minimax Turn
2022-11-21 21:44:52.053191Player 2 move: 14
Bot Random Turn
Minimax Bot WINS IN : 0.01775 SECONDS
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In [ ]: