CAB203 PROJECT : PEGS

STUDENT NAME: ROLL NO.

1 Introduction

Peg solitaire is a game in which pegs are placed in every hole but one and the player jumps over pegs along rows or columns to remove them. Usually, the goal of the player is to leave only one peg. When the game is played between two players it is called duotaire. In duotaire, the first player selects the initial hole. The player then alternately making peg solitaire jumps. In a jump,a peg moves over a adjacent peg into an empty hole. When no jumps are available, the game ends.

There are two rules

* The last player to remove a peg win.
* One player tries to maximize the number of pegs at the end of the game while their opponent seeks to minimize this number.

A board game for one player involving movement of pegs on a board with holes. Some sets use marbles in a board with indentations. The standard game fills the entire board with pegs except for the central hole.

 

A valid move is to jump a peg orthogonally over an adjacent peg into a hole two positions away and then to remove the jumped peg.

In the diagrams which follow, · indicates a peg in a hole, **\*** emboldened indicates the peg to be moved, and o indicates an empty hole. A blue ¤ is the hole the current peg moved from; a red **\*** is the final position of that peg, a red **o** is the hole of the peg that was jumped and removed.

Thus ,valid moves in each of the four orthogonal directions are:

**\*** · o → ¤ **o** **\*** *Jump to right*

o · **\*** → **\*** **o** ¤ *Jump to left*

**\*** ¤

· → **o** *Jump down*

o **\***

o **\***

· → **o** *Jump up*

**\*** ¤

The objective is, making valid moves, to empty the entire board except for a solitary peg in the central hole.

2 Problem

We are given a input series with X and o. X and o represent pegs and empty holes respectively.

We need to solve the puzzle in the defined pattern. We should analyse the statement and see how many possible paths are there ( if more than one solution, output as multiple, if none, write No Solutions )

If there is only one x at the end, it is a win situation.

We need to work out a solution until we win, if at all possible. We need to prepare a program in python to achieve the objective.

The board position is given as a Python string where we are taking an input series like XoXX where X indicates a peg and o indicates an empty hole.

The last player to remove a peg win. One player tries to maximize the number of pegs at the end of the game while their opponent seeks to minimize this number.

For example of a valid jump would be like

XoXX to this XXoo , where the rightmost peg has jumped to the left, removing the second from last peg.

The goal is to return a sequence of jumps that results in a board with a single peg. The sequence of jumps should be a Python list like so:

[(3, 'L'), (0, 'R')]

Where each item in the list is a pair indicating the position of the peg which is jumping (counting from 0 on the left of the board) and the direction (either L or R for left or right). If there is no sequence of jumps which wins the game, then your function should return None. If there are multiple sequence of jumps then the output prints that there are multiple solutions.

The conditions given for the problem

• The input string will consist of a single line of the characters X and o only.

• The input string will be at least three characters long.

3 Solution:

First we need to get the input. It is a string demarkating the sequence of pegs and empty holes. 'X' represents a peg and 'o' represents an empty hole. We need to analyze the series after that- we check for any occurence of 'XXo' or 'oXX' in the series. In case it is present, we are sure there is at least one possible move. So, we count the moves possible. We run a counter variable and count each time we encounter a 'XXo' or an 'oXX' in the series. In case, there is zero, no possible move can be made, for more than one, we have 'multiple possible moves' but for just one on the counter, we can work upon it. We take a step. If it is 'XXo', the direction is to be Right and for 'oXX', Left. To move and make a step, we simple replace the target position in the series with 'ooX' and a 'Xoo' respectively. After that, we rerun the afore mentioned steps with the updated series to proceed with the game. The game is won when we get exactly one 'X' in the series and all the rest be empty holes.

Output variable or global variable is taken as the final solutions such as to store the correct positions output is used, count possibility is used so that all the possible pathways in a particular string in one position for each pegs that is being stored. If there are possibility is more than there are more than one ways that will require a different approach.

4 Implementation

For every action we have defined a function after function names are listed then master function is there which coordinates the action of others, after that it checks it will go left or right or we can’t go anywhere. If it goes left or right then how we will proceed for 'XXo' or an 'oXX' in the series. In case, there is zero, no possible move can be made, for more than one, we have 'multiple possible moves' but for just one on the counter, we can work upon it. We take a step. If it is 'XXo', the direction is to be Right and for 'oXX', Left. To move and make a step, we simple replace the target position in the series with 'ooX' and a 'Xoo' respectively. that means we change main series so that alter series comes in place of it.This series will be fitted for infinte time until and unless it breaks. Break happens for three conditions, first condition is when it becomes multiple, second condition is when there is no result,third condition is when we win, we will understand that we are winning by counting the total number of X series eguals to 1 or else we didn’t win.