ASSIGNMENT 4 (Programming Assignment 2)
NAME: Yash Shreesh Dubey
UTA ID: 1001670330
Course code :-2188-CSE-5360-003-ARTIFICIAL-INTELLIGENCE-I--2018-Fall

Programming Language Used :- Python
The code runs sucessfully on Omega

Code Structure :-

The game uses two python files called maxconnect4.py and MaxConnect4Game.py.

maxconnect4.py:-

This file contains the following functions:

oneMoveGame(): Which initializes the one-move game mode, which returns output as a file with a single move played by the computer using aiPlay().

interactiveGame(): Which initializes the interactive mode, where the computer or human plays first depending on the input given at argv[3] i.e. either computer-next or human-next. The game will progress until the board is full and will then give result of the game as an output. Here the computer also uses aiPlay() to make a decision for a move to be played.

MaxConnect4Game.py:-

This file contains the following functions:

aiPlay(); This function is responsible for the moves that the computer will play. It initializes the minimax function which returns an optimal strategy to play a move based on the current game board state.

minimax(): The minimax() function uses two functions maxVal() and minVal() which are further used to implement alpha-beta pruning to find the optimal path.

minVal(): This function calculates the beta value.

maxVal(): This function calculates the alpha value.

Compliation and Execution instruction :-

The program can be executed in two modes i.e. interactive and one-move.

For One Move Mode :-

python maxconnect4 one-move [input_file] [output_file] [depth]

example :

python maxconnect4.py one-move input1.txt output1.txt 7

For Interactive Mode :-

python maxconnect4.py interactive [input_file] [computer-next/human-next] [depth]

example :

python maxconnect4.py interactive input1.txt computer-next 7

For measuring time of execution: time python maxconnect4.py one-move [input1.txt] [output1.txt] [depth]

References:

https://omega.uta.edu/~gopikrishnav/classes/common/4308_5360/slides/alpha_beta.pdf

https://aima.cs.berkley.edu/python/games.html

https://github.com/Cledersonbc/tic-tac-toe-minimax