Introduction to Artificial Intelligence
CSE 462
Term Project
Deadline: 25/12/2023

In this project you are required to implement a two player board game.

The game will take place on a 7x7 board. The input to the program will be a parametric turn limit and a parametric number of pieces for each player. Initial position of the pieces should be either selected randomly or it should be possible to enter the coordinate of each piece through an interface that you will design.

On each turn current player makes a single move:Moving his piece to one of its four neighbours. Game ends when one of the players has no valid move or the turn limit is reached.

The game will be played between AI and a user. In the beginning, your program will ask if the user will be Player1 or 2. If user is Player1, the first move will be user's. Otherwise computer will make the first move.

At the start of the game the number of pieces that belongs to each player and the maximum number of turns will be given by the user.

After board is initialized and at the end of each turn you need to print the coordinate system and the squares occupied with pieces labeled by their player indicator.

Computer's turn:
Computer will move its piece to an available square and print the new position as shown below.

"Computer moves the piece at g4 to g5"

User's turn:
If it is user's turn, user will type the desired move in same structure as the computer. First the coordinate of the piece that will be moved and then the new coordinate of the piece.

"Choose piece to move: c4
Choose the new position for c4: d4
Player moves the piece at c4 to d4"

You must check whether the desired moves and the piece coordinates are valid or not! If not, ask user for a valid move or a valid piece coordinate again.

Move Rules:
You need to define Player1's indicator as "X" and Player2's as "O" in the printed representation. Players can not move outside of the field. Players can not move to the squares occupied by the their opponent or by their own pieces.

Players can only move their piece to one of its four neighbours. Move can be vertical or horizontal.

Coordinate System:
Your coordinate system must have the following configuration

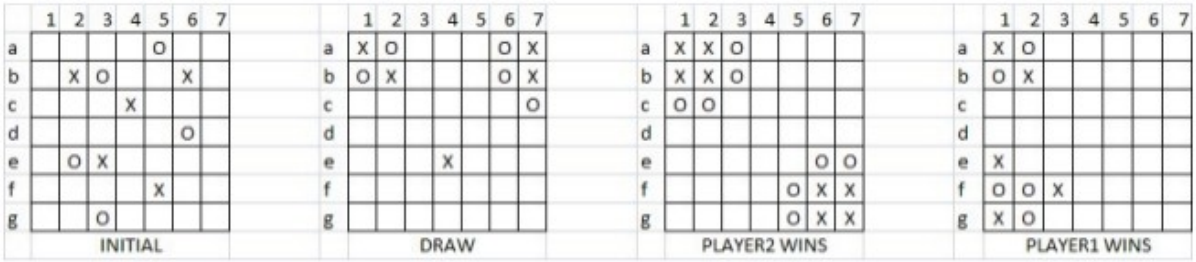
Columns are represented with numbers between “1 and 7”.
Rows are represented as letters between “a-g”. (“a1” is top left square and “g7” is bottom right.)

Game End & Winning:
The game ends when one of the players can not make a valid move or the turn limit has been reached. When one of the players can not make a valid move, the game ends and the other player will be the winner.

When the turn limit is reached, the game ends and the player with more valid moveable space will be the winner.

Grading:
You must provide a heuristic function which will be applicable to any combination of limit and number of piece values.

Examples:



In the DRAW case“X” can move to “c2,b3,e3,d4,f4,e5” and “O” can move to “c1,a3,a5,b5,c6,d7”.
P1 moveable space count is 6 and P2 moveable space count is also 6. So, the game is a draw.

In the Player2 Wins case “X” can not move so Player2(O) wins.

In the Player1 Wins case“X” can move to “b3,c2,d1,e3,f4,g3” and “O” can move to “a3,c1,e2,g3”.
P1 moveable space count is 6 and P2 moveable space count is 4. So Player1(X) wins.

You must submit your codes to coadsys page of this assignment. The implementation will be carried out by using the C programming language. You are supposed to submit a single C file (No header files are accepted) named xxx-yyy.c where xxx is you name and surname and yyy is your id.

Good Luck!