**Assignment 3**

**Implementation of Minimax algorithm with alpha beta pruning**

**B.Tech CSE VII Semester, Winter 2018**

**Co-ordinator: U. A. Deshpande**

**Date: 27th September 2018**

**Hard Deadline: 18th October 2018, Thursday (R1, R2, R3, R4 – 2.00 pm onwards)**

**Submit on email id:** [**uad.ai.assignment@gmail.com**](mailto:uad.ai.assignment@gmail.com) **with roll no, name and assignment number in subject line. (Viva in CSE 105 – contact Mansi A. Radke)**

**Simulate the two player game of Othello using minimax algorithm with alpha beta pruning appropriately. The user of the simulated game will play manually and the system should provide an interface for him to play. Need not be a graphical interface. The other player will be the system itself. The rules for the game are given below.**

**Rules for Othello game**

**Set up the game board and discs.** Othello is played on an 8 x 8 non-checkered board with 64 discs. Each disc is black on one side and white on the other. One player plays discs black side up and the other plays white side up. Place 4 discs in the center of the board; 2 with the black side up and 2 with the white side up so that the discs with matching colors touch diagonally. We will go by the rule that black plays first.

**Place the first disc in a spot that outflanks an opponent’s disc.** To “outflank” a disc means to surround a row of your opponent’s discs with two of your own discs. A “row” consists of one or more discs that form a line horizontally, vertically or diagonally.

**Flip the outflanked disc to its opposite side.** Once a disc is outflanked, it is flipped to the opposite colour and becomes the other player’s disc.

**Pass the turn to your opponent.** The opponent now places the second disc in a spot that outflanks at least one of the first player’s discs.

**Continue taking turns placing discs until a legal move isn’t possible.** For a move to be legal, a disc must always be placed in a position where it can outflank a row of the opponent’s discs. If this isn't possible, you must forfeit your turn until you can perform a legal move. If neither player can perform a legal move, usually because all spaces are filled, play ends. If a legal move is available, you may not forfeit your turn, even if it would be advantageous to do so.

**Count the number of discs of each color.** Once there are no more legal moves, add up all disks of each color. The player with more discs of his color wins the game.

**Valid moves:** The only invalid moves are those that do not outflank disks. You can't place a disk unless you are outflanking the opponent player’s disk. In one move, you can flank in two or even more sides, if possible. If there are two chances of flipping (e.g.:horizontally and vertically) on placing a risk, you can flip in both directions. You can flip as many discs as there are connected in a straight line from your played disc. This could feasibly be up to 18 discs at one time.

**Note: Only the discs which are outflanked by the stone you placed can be flipped. Flipped discs do not create chain reactions. This is very important to note. (As explained on the board with example).**